IMAGINING
IN THE
SPATIAL DESIGN PROCESS

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ABSTRACT

This thesis makes a significant contribution to knowledge in spatial design and spatial design education. Initially prompted by the desire to better understand how students generate ideas in design studio projects and thereby further support and enhance their learning, a multifaceted study was undertaken involving the integration of extant theory and empirical research. Guided by Grounded Theory methodology the study involved preliminary research of spatial design students and their experience of designing before focussing in a major empirical study on experienced architects and interior designers and their process of designing in the early conceptualisation stage. Through a process of theoretical sampling and constant comparative analysis extant theory from presence research and design methodology research was condensed with the empirical research findings to produce two outcomes: a taxonomy of imagining; and substantive grounded theory in the form of the Spatial Design Imagining (SDI) Model.

In addition, the thesis addresses additional concerns such as the popularisation of design thinking at the expense of embodied experience and sensation. It achieves this in three ways; first by providing greater clarity in the early stages of design, stages traditionally regarded as mysterious and magical; second through its holistic approach capturing the aesthetic as well as pragmatic aspects of the design process; and third, by undertaking research from a spatial as opposed to product perspective. Added to this is the study’s contribution to presence research by way of its elucidation of the aesthetic quality of imagining and the ‘split subject attitude’ of the designer. Overall, the research has sufficient explanatory potential to inform future educational application, theoretical research and methodological experimentation contributing to an even richer understanding of creative mental synthesis and more experientially meaningful responses by design graduates and practitioners.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AI</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>AIDA</td>
<td>Analysis of Interconnected Decision Areas</td>
</tr>
<tr>
<td>BIM</td>
<td>Building Information Modelling</td>
</tr>
<tr>
<td>BIP</td>
<td>Breaks in Presence</td>
</tr>
<tr>
<td>CAD</td>
<td>Computer Aided Design</td>
</tr>
<tr>
<td>CAVE</td>
<td>Cave Automatic Virtual Environment</td>
</tr>
<tr>
<td>CMC</td>
<td>Computer Mediated Communication</td>
</tr>
<tr>
<td>EEG</td>
<td>Electroencephalogram</td>
</tr>
<tr>
<td>GSR</td>
<td>Galvanic Skin Response</td>
</tr>
<tr>
<td>GT</td>
<td>Grounded Theory</td>
</tr>
<tr>
<td>ISPR</td>
<td>International Society for Presence Research</td>
</tr>
<tr>
<td>MEC</td>
<td>Measurement Effects Conditions</td>
</tr>
<tr>
<td>NSP</td>
<td>Non-Sentient Presence</td>
</tr>
<tr>
<td>QUT</td>
<td>Queensland University of Technology</td>
</tr>
<tr>
<td>SCR</td>
<td>Skin Conductance Response</td>
</tr>
<tr>
<td>SDI</td>
<td>Spatial Design Imagining</td>
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<tr>
<td>SP</td>
<td>Sentient Presence</td>
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<tr>
<td>SSM</td>
<td>Spatial Situational Model</td>
</tr>
<tr>
<td>TIM</td>
<td>Transportation Imagery Model</td>
</tr>
<tr>
<td>VE</td>
<td>Virtual Environment</td>
</tr>
<tr>
<td>VR</td>
<td>Virtual Reality</td>
</tr>
<tr>
<td>VRML</td>
<td>Virtual Reality Modelling Language</td>
</tr>
<tr>
<td>3D</td>
<td>3-Dimensional/three dimensional</td>
</tr>
<tr>
<td>2D</td>
<td>2-Dimensional/two dimensional</td>
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</tbody>
</table>
STATEMENT OF ORIGINAL AUTHORSHIP

The work contained in this thesis has not previously been submitted to meet requirements for an award at this or any other higher institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: [Signature]

Date: 28th February 2013
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PUBLICATIONS
CHAPTER 1: INTRODUCTION

Of all the questions we can ask about design, the matter of what goes on inside the designer’s head is by far the most difficult and yet the most interesting and vital (Lawson, 1980, p. 94).

This thesis is concerned with expanding our understanding of imagining in the spatial design disciplines of architecture and interior design. More than three decades after Lawson’s statement, the matter of “what goes on in a designer’s head”, or imagining and mental problem solving remains just as mysterious and just as pertinent, possibly more so given the social and environmental challenges facing humankind.

1.1 Impetus for the study

The impetus for this thesis began in the interior design studio with a desire to better understand how I could enhance student learning. Informing this were observations and concerns about the initial stages of designing and how much was developed ‘in the student’s mind’ (the imagining process) before it was externalised and made available for evaluation and comment. Despite attempts to help students develop drawing skills quickly so as to represent and expose their thinking and imagining (which is what we are led to believe we need to do as design educators), there was an inherent reluctance, even resistance, by the students. While this may be due to several factors including lack of confidence and inability to represent ideas, interestingly, further reading showed this to be a preference for some well-known designers such as architect Frank Lloyd Wright who proposed:

Conceive the building in the imagination, not on paper but the mind, thoroughly – before touching paper...Let it live there – gradually taking more definite form before committing it to the drafting board (Wright, 1928).

Reading this then prompted questions about what we needed to focus on and how we might in our educational role facilitate conceptualisation in the imagination in design education. As pointed out by Athavankar (1997), this was a question to which at that time there were very few, if any, answers:
[Design] education has neglected the development of visualization and imaging abilities, not fully realizing their potentials as well as implications for creative pursuits. There are no conscious attempts to promote the development of imagery and abilities to control images voluntarily and thereby facilitate problem solving (Athavankar, 1997, p. 39).

To better understand the context of this, an in-depth review of design methodological literature was undertaken which is presented in Chapter 2 of this thesis. As outlined, the review pointed to early research concerned with developing prescriptive models of design in order to improve process efficiency and product performance. Underlying this was an understanding of design as a mechanistic, sequential activity. When these new models failed to achieve the desired outcomes, especially in the spatial design areas such as architecture and interior design, attention turned to better understanding the nature of the design task, and with this a new conception of designing as a heuristic, satisficing activity emerged. As the review shows, this was facilitated through research concerned with the nature of design problems and design as a (creative) cognitive activity. Design problems were identified as being ill-defined and ‘wicked’ due to their complexity and future oriented nature, demanding a generative way of reasoning involving abductive, as well as inductive and deductive, thinking. While there was some associated research to do with visualisation and modelling, this was minimal, prompting Kokotovich’s (2000) call for more systematic methodology in order to extend the views expressed in the design literature relating to creative mental synthesis. He argued that whilst there has been extensive research over the past thirty years in perceptual psychology, the research had not specifically addressed issues in design thinking. He proposed that “[D]eveloping a detailed understanding of creative mental synthesis will serve to support design education, and therefore the improvement of design practice. Cognitive processes are central to the process and practice of design. Consequently, it is important that some of these cognitive processes be identified and understood” (Kokotovich, 2000, p. 2).

In response, there has been some recent research focussing on abductive thinking and the notion of framing (for example, Paton & Dorst, 2011) and imagining as a process (for example, Folkmann, 2010) but as emphasised in the thesis, this focuses
almost exclusively on thinking and problem solving processes in the industrial design discipline, downplaying the experiential and aesthetic dimensions to designing and the role of imagining in facilitating embodied creative mental synthesis, especially in spatial design.

1.2 Research questions, philosophical position and approach

The research described in this thesis seeks to address this limitation by responding to the primary question:

- What is imagining in the spatial design process?

Specifically, it asks:

- What is imagining as experienced by interior design and architectural practitioners?
- What extant theory is relevant and, when considered with current empirical research, is likely to expand current knowledge of imagining?
- What are some initial implications for spatial design education and future research?

In responding to these questions, the research approach was informed substantially by Grounded Theory methodology. Initial research concerned with finding an appropriate methodology revealed how Grounded Theory is particularly useful for exploring an issue faced by a specific community or group (Glaser, 1992), especially a qualitative issue situated as an integrated problem requiring an explorative, abductive-inductive approach for the generation of new insights. Philosophically, then, the research is situated in the interpretive paradigm grounded more specifically in a constructivist context concerned with how the complexities of the socio-cultural world are experienced, interpreted and understood at a particular point in time (Mills, Bonner & Francis, 2006a). Subsequently, what underpins this research is a strong congruence between a personal philosophical position, the stated aims of the research, and the methodological approach.
As explained in detail in Chapter 4, the research process developed iteratively over several years. Initially, the study commenced with a focus on student designing and their experience of designing in the early stages of the process. When very little emerged from the data analysis from the first exploratory stage, the study turned to postgraduate students. While this produced more data and understanding about the experience of designing, again it was limited and severely constrained by the students’ little or no practice experience. At this point, the decision was made to involve experienced practicing architects and interior designers. During this stage data were collected via questionnaire from 54 practicing designers and 10 follow up interviews. In parallel with this process, data were also collected from design methodological literature and presence literature at various points across these stages. Unlike traditional research where the literature review occurs chiefly at the beginning to establish a context, in this study, literature and existing theory were accessed when directed to as a result of previous analysis of literature and empirical data. In accordance with Grounded Theory methodology, the process was informed by the principles of theoretical sampling and constant comparative analysis to clarify and refine emerging themes until they were ‘saturated’. As referenced by Birks and Mills (2011):

In Grounded Theory research, the aim is to build theory through the construction of categories directly from the data. Through ‘theory-directed’ sampling, you are able to examine concepts from various angles and question their meaning for your developing theory (Strauss, 1987, p. 276 in Birks & Mills, 2011, p. 69).

An integral aspect of theoretical sampling for this study was the inclusion of extant theory from presence research. In this respect, it played a major role in extending an understanding of how one engages with complexity through immersion and how this can be mediated through technology or otherwise as will be described more fully in Chapters 3 and 7. Of particular note is how less artificial mediation and a lack of detail and stimuli appear to support richer aesthetic engagement. Empirical data collected from the designers also played a significant role and were central in the development of the taxonomy of categories of imagining, a major outcome of the study.
1.3 Outcomes

As indicated, one of the outcomes of analysis employing three levels of coding (open, axial and selective) is a taxonomy of categories of imagining incorporating [con]textual imagining, visual imagining (pictorial and spatial), and aesthetic imagining; the latter being significant in understanding embodied consciousness and the role of imagining in enabling designers to form poetic assemblages early in the design process before external visual representation is necessary. The development of this taxonomy and further research involving the integration of extant theory and empirical data led to the emergence of the Spatial Design Imagining (SDI) Model. Within the context of Grounded Theory methodology, the SDI Model represents an ‘illustrative mode’ of ‘substantive grounded theory’ possessing persuasive explanatory power, and in this regard the potential for application, practice change and the development of new knowledge for the spatial design disciplines.

The thesis proposes that in the context of spatial design by experienced designers imagining has the following features:

- Synthesis
- Orientation to the future demanding conjecture and simulation
- Simulation that involves imagined transportation to, immersion in, contextual engagement and intervention with the modelled environment.

Overall, the research suggests that imagining effectively supports designers at a macro, highly abstract, synthesising level in the initial stages of designing. This assists in the development of an aesthetic mental model that bridges the ‘problem space’ and the ‘solution space’, thus facilitating a more refined development towards the solution space and a satisficing outcome. Once this mental model is developed, imagining operates at a micro level and then iteratively between the macro and micro levels when undertaking simulation and facilitating aesthetic presence.

1.4 Significance of the study

In all, the research responds to the neglect in research literature of the role of imagining in spatial design by recognising designers’ experience of imagining and the role of presence research in revealing new knowledge, thus creating a new
framework for understanding imagining. Specifically, the research has unpacked the phenomenon of imagining identifying and providing further clarity of its elements and interrelationships. In exploring the implication of this in the education context, it strengthens the proposition that: less detail rather than more, inspires and informs the generation of an increased number of ideas; the generation of these aesthetic wholes early on are central to producing innovative, robust outcomes; and that the abductive development of these wholes or aesthetic assemblages is facilitated more effectively when undertaken initially and exclusively in the internal imaginal world of the designer.

The implications of these findings and outcomes are further explored in the thesis demonstrating the potential application of the SDI Model and the taxonomy of categories of imagining in the design education context. In addition, the thesis has addressed other concerns such as the popularisation of design thinking at the expense of embodied experience and sensation. It has achieved this in three ways: first, it has provided greater clarity in the early stages of design, stages traditionally described as mysterious and magical; second, it has done this in a holistic way capturing the aesthetic as well as pragmatic (practical, but necessary) aspects of the process; and third, it has undertaken research from a spatial as opposed to a product perspective. Added to this is the study’s contribution to presence research through its elucidation of the aesthetic quality of imagining and the ‘split subject attitude’ of the designer. In conclusion, the thesis makes a series of recommendations aimed at building on the foundational research of imagining further extending and consolidating a rich experiential understanding of creative mental synthesis.

1.5 Structure of the thesis

The thesis has six chapters. The first, Chapter 1, as presented here, describes the impetus for the study. This is followed by an outline of the research questions, underpinning philosophical position and research approach. In addition, it gives a brief overview of the major outcomes and their significance when explored as implications for spatial design education and their potential to contribute to the discipline’s body of knowledge. Chapter 2 presents an overview of design methodology research as a context for a closer examination of research focussing on design thinking, cognition and concepts that connect with the phenomenon of
imagining. Chapter 3 then provides an overview of presence research including its history and areas of investigation that are of particular relevance to imagining such as the role of cognition in presence research. In Chapter 4 a description of the methodology, research process and research plan are provided together with justification of the decision to use Grounded Theory as the main methodological framework. Issues of research quality and rigour are also addressed. Chapter 5 is concerned with the outcome of the analysis of empirical data obtained from the designer participants of the study. The first section describes how designers regard imagining in the design process. The second section presents the outcome of a closer examination of imagining and the emergence of empirically grounded categories of imagining. Chapter 6 focuses on the main outcome of the study – the Spatial Design Imagining (SDI) Model. It outlines the development of the model according to the integration of extant theory from design methodology, the empirically grounded categories of imagining and the extant theory from presence research. Chapter 7 concludes the thesis highlighting the significance and contribution of the study in enhancing knowledge of imagining and its role in spatial designing. It provides further demonstration of its potential applicability by exploring the implications of the findings for spatial design education, in particular design studio teaching and learning. It then suggests some areas of wider relevance and contribution and concludes with a number of recommendations for implementation and future research.
CHAPTER 2: RESEARCH OF DESIGN PROCESS, THINKING AND IMAGINING

2.1 Introduction

This chapter presents an overview of design methodology research. It commences with an historical overview of research concerned with the general area of design process. While the main focus of this thesis is imagining in the spatial design disciplines of architecture and interior design, the review cannot ignore early research in engineering and industrial design and the way this has influenced and dominated methodological research in architecture and interior design. Further to this, an examination of design process research also provides a context for a review of research focussing on design thinking and cognition, which, in turn, provides a platform for a closer examination of imagining. These aspects of designing are presented in Figure 2.1 embedded in the broader area of design practice. While there is a body of literature concerned with architectural and interior practice, the focus of this review is chiefly on the process undertaken by the designer during the initial concept and design development phases of a design project; it is during these stages that imagining assumes a significant role. It is acknowledged that while communicating and representing “what goes on in the designer’s head” is an important part of the design process, the concept of design communication and representation is beyond the scope of this literature review. Additionally, the review of educational theories surrounding learning (in general), design education and creativity are also considered to be beyond the scope of this thesis.
This chapter, together with the following chapter which includes a review of presence research, highlights the extant theory considered in relation to the findings of the empirical study described in Chapter 5 and which contributed to the generation of the Spatial Design Imagining (SDI) Model presented as the outcome of this thesis in Chapter 6.

2.2 Design Process

For the purposes of this research, design process describes the work undertaken by a designer or design team in generating a proposal related to a building or interior environment. In design practice, this proposal is further documented and developed contractually to effect its realisation for use by the client.

Several authors including Franz (1994, 1997, 2000a, 2000b) provide overviews of methodological research in design and architecture up to the late 1990s, which reveal an initial emphasis on interventionist and prescriptive models to inform more effective and efficient designing and enhanced product performance. When these models failed to have the anticipated outcomes, researchers turned their attention to
better understanding the ill-defined nature of the design task and how designers cognitively manage ill-definition as part of the design process.

**Design as a mechanistic, prescriptive activity**

Following developments in mathematics, logical methods and behaviourist psychology in the early 1900s, methodological research in design gained momentum with the first conference on design methodology in London in 1962 attended by a range of disciplines including engineering, industrial design, and architecture (Franz, 1997, p. 37). Despite the presence of architecture, some of the first models developed were by engineers such as Asimow (1962), and the industrial designers J. Jones (1963) and Archer (1965). Common to these ‘first generation’ (Rittel, 1972), ‘glass box’ (Jones, J. 1970) analysis-synthesis-evaluation models was a conception of design as a rational process involving a systematic decomposition of the problem into sub-problems. “Design methods people were looking at rational methods of incorporating scientific techniques and knowledge into the design process to make rational decisions” (Bayazit, 2004, p. 18). Similarly for Archer (1980), “design research is a systematic process whose goal is knowledge of, or in, the embodiment of configuration, composition, structure, purpose, value, and meaning in man-made things and systems” (Archer, 1980, pp. 30-47). Early on then, logical process and scientific principle were integral concepts in design methodology research. For Fielden (1963), design was understood as “the use of scientific principles, technical information and imagination in the definition of a structure, machine or system to perform pre-specified functions with the maximum economy and efficiency” (Fielden, 1963, p. 60).

These concepts were also considered central to improving architectural process and outcomes. One of the early researchers in this area was Alexander (1964) who challenged designers “to take a more systematic, rational approach to designing by mathematically analysing and explicitly representing the problem in terms of a hierarchy of subsets of problems. Identification of these subsets and their pattern of interaction provides the logic for the recombination of the subsets in physical form” (Franz, 1997, p. 31). To help with combining sub-problems simultaneously rather than sequentially into an overall optimum solution, Luckman (1969) drew on the
work of Archer (1965) to develop the procedure known as ‘the analysis of interconnected decision areas’ (AIDA) (Franz, 1997, p. 34). In another vein, Thornley (1963) focussed on systematising the initial stages of designing from a practice perspective and is attributed with what we now know as brief development, concept development, schematic development, and design development (Franz, 1997, p. 34).

In terms of technically oriented research and its acceleration beyond the 1960s, Franz (1994, 1997, 2000a, 2000b) points to earlier research in cognition and linguistics and their later influence on information processing, computer science and artificial intelligence as having a major influence. In 1963, researchers began utilising computer technology to produce computer graphics systems in wireframe and polygonal modelling. Moseley (1963) was one of the first researchers who developed and utilised computer technology to design the first layout optimisation program for a hospital operating unit. Researchers such as Simon (1969) and Newell and Simon (1972) increasingly regarded computer science as a way of managing complexity and the inability of humans to cognitively deal with complex situations. Franz (1997) describes how Mitchell (1977, 1990) drew extensively on artificial intelligence, cognitive science and the theory of computation in attempts to demonstrate how the structure of architectural design reasoning could be understood logically (Franz, 1997, p. 41). In the main, however, such attempts were not fruitful with Radford and Woodbury (1991) delimiting the use of computation in design to “the formulation of mathematical systems for design representation and generation; the discovery and analysis of algorithms that perform fundamental computations in design systems; the implementation of computer programs that employ spatial grammars and parametric design systems; the study of existing designs in generative terms; and the exploration of new systems with generative tools” (Franz, 1997, p. 43). Even with recent advances in computer science and Building Information Modelling (BIM), the use of computational tools in the spatial domains of architecture and interior design largely remains restricted to that outlined by Radford and Woodbury in 1991.
Limitations with the conception of design as mechanistic and prescriptive began to appear in the 1960s in line with increasing awareness of the ill-defined nature of the design task, what this means in terms of the outcome and how this invokes a particular way of thinking and doing.

**Design as a heuristic, satisficing activity**

Studies by Darke (1979), Lawson (1979), Zeisel (1981, 1984), and Schön (1983) appear to be among the first to differentiate the architectural design process from other activities. In relation to research by Darke (1979), her approach to managing ill-definition was to apply what she terms ‘primary generators’ which are concepts about the problem which help constrain the problem space to be searched. The constraints are then used to test possible ‘solutions’ or ‘conjectures’. While Darke (1979/1984) uses the term ‘primary generator’, it has also been referred to as the ‘kernel idea’, ‘key concept’, ‘early solution conjecture’, ‘primary position’ and ‘guiding theme’ (Cross, 2001a, 2004b; Guindon, Krasner & Curtis, 1987; Kant, 1985; Lawson, 1980; Rowe, 1987; Ullman, Dietterich & Staufer, 1988). Subsequently, the ensuing process has been qualified as ‘position-driven’ design, ‘early fixation’, ‘premature commitment’, ‘early crystallisation’, or ‘solution fixation’ (Ball, Evans & Dennis, 1994; Cross, 2001a; Goel, 1995).

In this respect, then, researchers moved from an understanding of designing as a step-by-step sequential process to an understanding of it as fluid and dynamic. They began to realise that designers constantly generate new task goals and redefine task constraints; and even if they are cognisant of prescriptive models, designers do not follow them systematically (Akin, 1979/1984; Carroll & Rosson, 1985; Cross, 1984; Dasgupta, 1989; Visser, 1987a).

Extending on the work by Darke (1979) and Lawson (1980), Zeisel (1981, 1984) proposes that there are three elementary design activities: imaging, presenting and testing, and that these are undertaken iteratively (Figure 2.2). Here, potential ideas are presented, most commonly, externally through drawings of varying abstraction in order to be ‘tested’ by the designer or used to invite feedback by others. Adding to this, Schön (1983) asserts that designers formulate and test rules in the form of visual
communication: drawings and models. “Rules in design are largely implicit, overlapping, diverse, variously applied, contextually dependent, and subject to exceptions and critical modification” (Schön, 1983, p. 133). For Schön (1983), situations of uncertainty, novelty and complexity, whether in design or other areas, demand a process of reflection in and on action; in other words, a knowing-in-action.

Figure 2.2: The three elementary designing activities based on Zeisel (1984)

For Cross (1984), this is described as a ‘designerly way of knowing’: “there are designerly ways of knowing distinct from the more usually recognized scientific and scholarly ways of knowing” which involve tackling ill-defined problems as well as well-defined problems, a constructive (or abductive/productive) mode of reasoning; and the use of codes for communication and translation from the abstract to the concrete (Cross, 1984, p. 226). While this notion of abductive thinking will be examined more fully in the subsequent section, the following discussion is useful in providing an initial description differentiating it from inductive and deductive forms of reasoning: “Abduction, or as we have it production, is the only logical operation which introduces new ideas; for induction does nothing but determine a value; and deduction merely evolved the necessary consequences of a pure hypothesis. Thus production creates; deduction predicts; induction evaluates” (March, 1984, in Teeravarunyou & Teixeira, 2002, p. 122).
Summarising designerly ways of knowing in later work, Cross (2001a) describes how working in novel situations with incomplete information demands that designers use imagination and constructive forethought in a heuristic way aided by drawings and modelling (in Franz, 1997, p. 58). To this end, his understanding was most likely informed by other research conducted in the 1980s and early to mid 1990s. According to Franz (1997), the 1980s saw the development of several models of architectural designing, including a descriptive model by Goldschmidt (1983), providing the basis for future research in the 1990s and a greater focus on conjecture, and prescriptive models by Heath (1984) and Akin (1986a) (Franz, 1997, p. 84).

More recently, Nelson and Stolterman (2003) take a holistic view characterising design inquiry as not compatible with the existing domains of inquiry. They frame the practice of design as a broad culture of inquiry and action, asserting that rather than focussing on problem solving to avoid undesirable states, designers work to frame problems in terms of intentional actions that lead to a desirable and appropriate state of reality. In their view, design is viewed as a unique way to look at the human condition, and is understood through reflective practice, intellectual apperception and intentional choice. Their proposition is that a new philosophical culture in design not only applies to those fields focused on physical design and traditionally thought of when as design (for example, architecture, interior design, graphic design, software design), but encompasses other design areas including ‘educational systems design’.

Essentially, they argue that this new culture promotes a ‘design way of thinking’, perceiving that design is the ability to imagine “that-which-does not-yet-exist” and make it appear in a concrete form as purposeful new addition to the real world. Taking this notion, they describe the need for imagination and judgment, where imagination allows us to create the “not-yet-existing” through a process of composing parts, functions, structures, processes, and forms in way that fits the design situation. Judgment is used to evaluate that composition to determine how well it fits (Nelson & Stolterman, 2003). However, enterprise also requires additional skills in design communication (both internal and interpersonal) to bring the composition into a perceivable form that allows judgment to occur.
According to Nelson and Stolterman (2003), there are four conceptual foundations of design: *the real; service; systems thinking;* and the *whole*, where ‘the real’ is intended to clarify what should be the express focus of design inquiry. The ‘real’ world, (while including the ‘true’ or natural world) is an artificial world, a created design. The design process concerns moving from general and universal to a specific design using a multifaceted form of inquiry (design inquiry), composed of the real, the true, and the ideal. ‘Service’ is the crucial element of design that distinguishes it from other traditions of inquiry. ‘Systems thinking’ is ‘the’ organising element in design reasoning, providing a different perspective to traditional design theory and practice. Finally, design is to be understood as a complete ‘whole’, not as a series of tasks, or steps.

They propose that the fundamentals of design include the essential skills of design inquiry and practice. These essential skills are: desiderata, interpretation and measurement, imagination and communication, judgment, composition, and production and care taking. Desiderata (those things that are desired) is the process of giving direction and the importance of intention as an initiator of design action. Interpretation and measurement concerns appreciative judgment about what is to be considered and the exploration of possibilities, leading to a compositional interpretation. Imagination and communication concerns design creativity, and describe the phases of the design communication process. Judgment defines various types of judgments (appreciative, quality, instrumental, and framing) in the design process and delineates the differences between judgments made by the client and those made by the designer. Composition is the phases in the design process from the ‘parti’ (the ‘ah-ha’ experience) through to the design innovation or ‘ultimate particular’. Production and care taking is a focus on the care of the material of the design and management of the production process.

As indicated previously, the research summarised in this section and methods or models developed acknowledge a specific type of dynamic in relation to the designer and the design task. Roozenburg and Cross (1991) convey this graphically in Figure 2.3. According to Dorst (2004), any method for aiding design activities contains assumptions about all three dimensions.
The realisation of design as a heuristic, satisficing activity that emerged in the 1960s persists to this very day. As Kolko (2010) observes, “Designers, as well as those who research and describe the process of design, continually describe design as a way of organizing complexity or finding clarity in chaos” (Kolko, 2010, p. 15). How designers do this has been the subject of research focussing more specifically on the designer, and their design thinking and cognition in relation to the design task at hand.

2.3 Design Thinking and Cognition

“Of all the questions we can ask about design, the matter of what goes on inside the designer’s head is by far the most difficult and yet the most interesting and vital. This leads inevitably into the realm of cognitive psychology, the study of problem solving and creativity, in short thought itself” (Lawson, 1980, p. 94).

As the following discussion will highlight, interest in more fully understanding design thinking and cognition followed the earlier discussions in designing; thus increasing the realisation of the ill-definition and uncertainty managed by designers when designing.
The nature of design problems
The understanding of design as that involving a special kind of problem solving is largely attributed to foundational research by Reitman (1964) and Eastman (1970), followed by studies by Rittel and Webber (1973) and Simon (1973) (Franz, 1997, p. 54). Eastman’s work, for example, points to a process in problem solving involving matching appropriate forms of representation such as words, diagrams and plans with particular information processing activities (Eastman, 1970, p. 30). Franz (1997) describes how this research and that of Goldschmidt (1983) and Mackinder and Marvin (1982) suggest a reliance of past personal experience for generating constraints for problems possessing no defined criterion for testing a proposed solution. Such problems are described by Rittel and Webber (1973) as wicked and incorrigible, and by Simon (1973) as ill-structured. With no formulation for establishing what is or what is not optimum, designers wanting to change existing situations into preferred ones (Simon, 1981) can only work towards what Simon (1969) refers to as a ‘satisficing’ outcome.

Following on from this research, the ill-defined nature of design problems continues to be acknowledged (Akin, 2001; Michalek & Papalambros, 2002; Ormerod, 2005), as does the understanding in architecture that the process can only be at its best satisficing (Buckingham & Shum, 1997; Conklin, 2006). As Akin (2001) states, rather than this occurring in every discipline, designers from different disciplines vary on this point: while architects indeed proceed to satisficing, engineering designers tend to adopt more objective methods in their selection among possibilities and may proceed to optimisation. Further to this, rather than one solution, which would be ‘the’ correct solution, design problems have several acceptable solutions, which are more or less satisfying.

According to Wade (1977), designers work towards a satisficing outcome by drawing on existing exemplars and/or by applying constraints to the point where a certain outcome appears feasible. Coupled with generic knowledge (including from design methodology, the application domain, and the technical domains that underlie the design project) reuse of knowledge (from specific previous design projects) through analogical reasoning has been observed in many cognitive design studies as a central approach in design (Ball & Christensen, 2007; Ball, Ormerod & Morley,
2004; Bhatta & Goel, 1997; Visser, 1995, 1996). While the majority of examples of reuse concern software design (Visser, 1987b), this technique is also associated with product design (Visser, 1995) and architecture (Demian & Fruchter, 2005).

Lawson (1980), one of the most quoted researchers within the design theory area, argues that designers rely on episodic memory rather than general principles or problem-solving algorithms (that is, process models) for generating design ‘solutions’. Episodic memory includes direct experience with designed artefacts (designing them or experiencing the designs of others) and vicarious experience with descriptions and representations of designed artefacts. More recently, Lawson (2004) explains how “precedent stored in the form of episodic memory”, either of one’s own design or of the designed artefacts of others, “is used by experts to recognize design situations for which gambits are available”, where gambits are defined as “patterns known to have certain properties and to offer certain capabilities” (Lawson, 2004, p. 443; p. 449).

**Design as a (creative) cognitive activity**

Not only are design problems ‘wicked’ because of their substantive complexity, they are ‘wicked’ and ill-defined because they are associated with producing something for the future. As described previously, design involves conjecture; it is productive and generative, in other words, it is a creative process inviting closer examination of the cognitive processes underlying the individual’s capacity to generate new ideas or understandings.

Many theories in design research are dualistic knowledge models to explain design knowledge frameworks: the rational, problem-solving paradigm of design based on a techno-positivist framework developed by Simon (1969) and the alternative constructivist epistemology, proposed by Schön (1983), based on human perception and ‘reflection-in-action’. However, the limitations of both models have been recognised and challenged by several authors, the most significant being Snodgrass and Coyne (1992, 2006). The polarity between the rational, systematic approach of design science and that of intuitive, tacit, practice-led approaches, described by Coyne and Snodgrass as ‘design’s dual knowledge thesis’, has underpinned much of the discourse about design research over the last forty years.
Taking inspiration from Schön’s (1993) musings on metaphor, Snodgrass and Coyne (2006) argue that we need to become aware of how the metaphors we use often determine how we think about design, suggesting that metaphors as an alternative to models have a better fit and are better able to capture complex, situated and to a large extent embodied human experience, for example, of designing.

Their suggestion is that the “hermeneutic circle” is a better metaphor for designing than the dominant metaphor of problem solving because it does not “destroy the complexity, subtlety, and uniqueness of the design situation; or privilege or preclude aspects of the process, but rather respects their interdependence and interaction” (Snodgrass & Coyne, 1992, p. 72). Further, the process of interpretation does not necessarily stop at the first access to meaning, but rather “it can prompt a revision of the projection allowing other meanings to appear. Metaphors and models do not have a static, on-off meaning but are potentially capable of revealing multiple meanings that can be progressively disclosed by the back and forth meaning of the hermeneutical circle’ (Snodgrass & Coyne, 1992, p. 68).

They perceive that design is a hermeneutical activity, and that interpretation is the core of architectural production and hence, architectural understanding. In proposing hermeneutics, this attempts to address the question of how understanding (essentially a cognitive process) occurs. This understanding involves the act of projecting self or understanding onto the activity being undertaken. Snodgrass and Coyne’s (2006) hermeneutical circle is analogous to Schön’s concept of the “reflective practitioner” who undertakes “reflection-in-action”; the relationship between thought and action. As Coyne and Snodgrass note: “Even a cursory examination of the protocol studies of Donald Schön indicates that the design process he describes works according to the dynamics of the hermeneutic circle, proceeding by way of a dialogic exchange with the design situation” (Snodgrass & Coyne, 1997, p. 22).

To design is to engage in a process of understanding through the generation and interpreting of design responses. This is essentially a process of interpretation and underlying every act of understanding is an “anticipatory projection of meaning” (Snodgrass & Coyne, 2006, p. 38).
Of relevance is the research on abductive as opposed to inductive and deductive thinking. As March (1984) observes, the model of explanation in natural science primarily utilises deductive inference, yet social science uses inductive inference. He writes, “Abduction, or as we have it production, is the only logical operation which introduces new ideas; for induction does nothing but determine a value; and deduction merely evolved the necessary consequences of a pure hypothesis. Thus production creates; deduction predicts; induction evaluates” (March, 1984, in Teeravarunyou & Teixeira, 2002 p. 122). As further explanation, where deduction shows that the premise provides a guarantee of the truth of the conclusion, and a conclusion that is so strong that, if the premise is true, it would be impossible for the conclusion to be false; induction is an argument in which the premise is supposed to support the conclusion in such a way that if the premise is true, it is improbable that the conclusion would be false. On the other hand, abduction could be thought of as the “step of adopting a hypothesis as being suggested by the facts...a form of inference” (Peirce, 1913, in Kolko, 2010, p. 19). In other words, “abduction can be thought of as the argument to the best explanation... It is the hypothesis that makes the most sense given observed phenomenon or data and based on prior experience” (Kolko, 2010, p. 20).

As such, in the abductive reasoning process in design, the various constraints of the problem begin to act as a ‘logical’ basis, and the designer’s work and life experiences begin to ‘shape’ the abduction. The abductive process acts as inference or intuition, and is directly aided and assisted by personal experience.

2.4 Imagining

This section provides an overview of research dealing with several aspects related to the concept of imagining. These include: imaging, visualisation and mental imaging; mental models, simulation and imaging; and creative mental synthesis. Effort has been made to distinguish between these aspects despite the tendency in research for specific terms to be used interchangeably. As the review will reveal, there is very little research that focuses explicitly on imagining.
Imaging, visualisation and mental imaging

Previous discussion has included reference to Zeisel’s model of designing and three fundamental activities involving imaging, presenting and testing. In this model, “Imaging means forming a general, sometimes fuzzy, mental picture of part of the world. In design, as well as in other types of endeavours, images are often visual; they provide designers a larger framework within which to fit specific pieces of a problem as they are resolved” (Zeisel, 1981, p. 7). Also described as or in association with is the term ‘visual thinking’ which Roam (2008) describes as “taking advantage of our innate ability to see—both with our eyes and with our mind’s eye— in order to discover ideas that are otherwise invisible, develop those ideas quickly and intuitively, and then share those ideas with other people in a way that they simply get” (Roam, 2008, p. 4). Seeing an image in one’s mind is also described as mental imaging.

References to mental imaging appear in the 1960s with Arnheim (1969) pointing out its significance in visual arts. Suggesting that there is a presence of abstracted visual information in memory and in making this point, he provides an example discussing how an artist can draw something from memory, going through a process of drawing and then checking that drawing against the mental image. Essentially the artist, when asked to draw something from memory, would begin a drawing and then continually return to the drawing to make corrections as the abstracted visual image brought more and more information to the forefront of memory. Furthermore, Arnheim (1969) states that mental images function as one of three types of images: pictures, signs or symbols. However, sometimes one mental image may serve simultaneously in all three types of images, but essentially, all three types of images may actually act as a symbol for an idea or image that is far more complex than can be pictured. The picture image will not be an exact replica of the thing itself, states Arnheim (1969), but rather will have ambiguities causing the thinker to make value judgements in the absence of needed information.

Mental images acting as pictures have a low level of abstraction and may inform on such levels as shape, form, colour or movement (Arnheim, 1969; Damasio, 1999). A sign image portrays a particular concept or idea without actually showing the physical detail, but may suggest simply the qualities of that thing for which it is a
sign (Arnheim, 1969). It is an abstraction only inasmuch as the sign itself is an abstraction of a more complicated idea or concept; letters, numbers and mathematical signs fall into this category of mental image. For example, a letter can be imagined as a sign, but the thought of the letter “A” may specifically be referring to a letter, a word, a grade or an evaluation.

Finally, in terms of mental images acting as symbols, Arnheim (1969) explains that a symbol is a further abstraction of a picture and stands for something much more complex than that which the symbol actually is. A good example of symbolism is that of music notes where a music note on a stave can communicate at a glance the pitch of the tone and the duration of the tone.

McKim (1972), in discussing design issues, views mental imaging as a component of visual thinking and stresses the need for learning to voluntarily control the transformations and manipulations of images in the design process. Studies undertaken by Sommer (1978) of architects’ design process revealed the flexibility and non-material character of images and their ability to allow unusual transformations. Singh (1999) also undertook observational analysis of the architectural design process, identifying that mental imaging plays an important role in the design process and that first, the “flexibility and speed available in mental imaging is far more superior than sketching or modelling may offer enabling a student to experiment and choose between options at higher rate than sketching or modelling” (Singh, 1999, p. 4). Other indirect references to mental imaging can be found in literature to do with artificial intelligence (AI) and expert systems developed for design problem solving (Oxman, 1994).

Connecting more directly to conjecture, mental imaging is also understood to occur when a designer imagines or visualises the possible outcomes or solutions to a design problem using internal pictures (Block, 1981; Damasio & Damasio, 1996). Here imagery is a cognitive function of the brain, allowing the designer to ‘see’ and manipulate ideas and possible solutions (Block, 1981). To date, there still remains a debate among researchers as to whether mental imagery is pictorial or descriptive (Block, 1981), with Fodor (1975) and Kosslyn (1978a, 1978b, 1980) proposing that mental imagery involves visualising using pictures and descriptive terms. As there
are no physical pictures in the brain, their argument is based on the idea that mental images represent in much the same way that a picture does. On the other hand, Pylyshyn (2001, 2002a, 2002b, 2003a, 2003b, 2003c, 2004) and Dennett (1969, 1978, 1981, 1991, 2002) argue that visualisation is strictly descriptive in nature with mental imagery sitting firmly as a linguistic representation.

In contrast, Damasio (1999) asserts that thought is made up largely of images. Whenever an individual speaks, writes a sentence, or draws an image, that thought begins with a visual image: “If those thoughts were not imageable, we would not know them and would not be able to manipulate them consciously (Damasio, 1999, p. 107). Indeed, images are the main content of thought. In discussing visual thinking, Damasio (1994) suggests that images of things that were experienced visually are more concrete than images of things made up. If the thing that is known is something that is experienced externally, the brain will record in detail all of the facts of what is seen. If the thing that is known is experienced internally it will be more vague or abstract, but these “are images nonetheless” (Damasio, 1994, p. 108).

Hoffman (1998), on the same topic of visualising and imagery, presents a compelling argument that all experiences are in part a construction of the mind. Following several studies of patients affected by brain damage, Hoffman developed a series of rules that the mind applies to constructing an understanding of visual input. Where there has been damage to certain parts of the brain, a patients’ ability to construct a visual reality is affected. The process for this is that an image is first projected onto the retina and the brain then interprets the meaning of the scene according to the visual input from the retina. Following this, the brain then utilises both emotional and rational intelligence to construct the reality of what is being seen.

For Damasio (1994, 1999) and Hoffman (1998), visual imagery is built on experiences, and is constructed and manipulated by the brain. As the foundation for thought, it is also considered to be the foundation for creativity. Finally, they conclude that visual experience is the “raw material” (Hoffman, 1998, p. 202) in all imagined constructions. Thus a designer can experience, see and read and thereby collect the necessary information to create a library of mental images. It is this ability that allows the designer to call upon mental images causing a dialogue to
occur in the process of solving a design problem and creating of a novel solution to a design problem.

Piaget’s (1971) research suggests that perception, mental imagery and language develop hierarchically, and form the basis of thought. According to his work, perception and mental imagery share a common basis in activity. He describes how mental imagery develops through action and can be developed through activities that involve imitation. Perceptual development is based on activity while the imitation of things, particularly through drawing, is linked to the development of mental imagery.

In his research on mental imagery, Piaget distinguished three forms of visual images, which he called static, kinetic and transformational images. Static images represent objects which do not rotate or move; kinetic images are those images which are based on the experience of an object’s movement; and transformational images are those in which as an object is viewed it changes shape or form rather than position. This requires the transformation of a mental representation of the object, through a process involving mental manipulation of the visual image. Whilst Piaget’s theories were based on extensive observation of children, he suggests that perception, mental imagery and language develop over the whole life span of an individual, as separate processes which are used in thought (Piaget, 1971).

The ability to work with static, kinetic and transformational images and to manipulate these mentally is fundamental to a designer; in particular, these different forms of mental imagery are central to the design process, and form the basis of the ways in which designers represent and communicate their ideas through sketching and drawing. Indeed there is growing research on the relationship between sketching and imaging. Sketching is one of the most common tangible activities in many fields of design and is a means by which the images in the mind’s eye can be externalised by the designer.

The work of Goldschmidt (1983) was previously discussed in relation to the development of a model of designing. Wanting to give greater emphasis to design as a cognitive activity, Goldschmidt (2004) draws on the work of Fish and Scrivener (1990) to study the use of sketching in the design process, finding what she calls an oscillation between propositional thinking and descriptive thinking. One experiment
was the observation of designers using two types of argumentation, based on these
two types of thinking, during the process of design. The first is described as
depictive and sketch based; and the second is non-figural. The use of these two types
of argumentation oscillates over much iteration, particularly in skilled designers.
Goldschmidt (2004) states that: “the order in which arguments switch modalities is
not important. What is significant is the fact that the shift occurs both ways.... [It]
helps translate the particulars of form into generic qualities, and generic rules into
specific appearances” (Goldschmidt, 1991, pp. 138-139). In non-sketching protocols,
Goldschmidt reports that “‘seeing as’ arguments are by far in the minority”
(Goldschmidt, 2004, p. 140).

In their research, Fish and Scrivener (1990) describe the interplay between the two
modes of mental representation – propositional (largely symbolic) and analogue
 (“quasipictorial, spatially depictive”) – required for sketching (Fish & Scrivener,
1990, p. 121). As designers sketch, what they are seeing always undergoes a form of
mental manipulation before it is represented as marks; in turn, the marks “generate
mental images that may in turn influence the sketch” (Fish & Scrivener, 1990, p.
120). Although these authors state that in the activity of sketching, designers pull
images directly from real life situations and objects for the most part, they also state
that “there is objective evidence that spatially depictive images generated from
memory have many of the properties needed to explain the ability of artists and
designers to generate, manipulate, combine and inspect in imagination non-existent
visual objects” (Fish & Scrivener, 1990, p. 122).

Although Laseau (1986) did not conduct formal studies in the area of sketching in
architecture, he brought several decades of observational and professional experience
to bear on his discussions of visual artefacts that represent the non-formal properties
of a design space. His work makes it clear that visual artefacts are not produced
solely for the sake of picturing an essentially visual product. To highlight these
experiential insights, Suwa and Tversky (1996), in their study of sketching among
architecture students and professionals, conclude that study participants were able to
use their sketches to explore not only visual relationships among parts but also to
explore functional relationships (such as lighting or circulation). They note that:
“This analysis has revealed that sketches make apparent not only perceptual relations
but also inherently non-visual functional relations to both advanced design students and practicing architects” (Suwa & Tversky, 1996, p. 192).

Drawing upon Goodman’s (1976) taxonomy of symbol systems in which non-notational systems are defined as ambiguous with respect to what a given mark may stand for, Goel (1995) offers an explanation for the mechanism whereby sketching supports cognition during the design process. They indicate that sketches leave options open because the elements of the symbol system used in sketching are non-notational. As an example, a circle in a sketch may represent a sun, a wheel, a plate, or anything round. This ambiguity allows the designer to defer specific interpretation of the sketch (or diagram, as described by Laseau, 1986) and entertain or realise alternatives within the image that may not have been intended at the time of its creation. Supporting the neurophysiologic view of representations in the brain as quasi-pictorial and manipulable, they assert that “sketch indeterminacy may trigger innate recognition search mechanisms into generating a stream of imagery useful to invention” (Fish & Scrivener, 1990, pp. 121-123).

Examining the process of mental imaging in the context of computerised visualisation and industrial design, Athavankar (1996, 1997, 1999) raises some issues pertinent to design education. Whilst mental imaging differs between industrial design (typically small-scale objects of use) and architecture and interior design (larger-scale spaces which people typically inhabit), Athavankar does raise an important question:

Design education traditionally has emphasized sketching and its use in creative explorations and is now supporting the use of computers as an alternative representation tool. The education has neglected the development of visualization and imaging abilities, not fully realizing their potentials as well as implications for creative pursuits. There are no conscious attempts to promote the development of imagery and abilities to control images voluntarily and thereby facilitate problem solving. Knowing full well that working on computer workstations makes greater demands on imaging abilities, how effective will future
designers be, without the ability to develop virtual models in their mind to support their thinking? (Athavankar, 1997, p. 39)

Athavankar (1997) is one of few design theorists who specifically address the notion of imagining in designing as its own process, unrelated to sketching or decision making. Folkmann (2010) is one such theorist who specifically describes and analyses the process of imagination, seeking structural features of the imagination in the dynamic interaction between consciousness and the exterior material work, and how that relates to the design process.

Folkmann (2010) argues that imagining in the design process has received little focus in design theory, despite there being several studies of significance (Folkmann, 2010, p. 1). One such study is by Liddament (2000), who argues that not only is it impossible to know what is going on in the inner space of consciousness with regard to imaging and picturing in connection with design (‘what goes on in the designer’s head’), the very notion of a particular essence of creative imagination is problematic (Liddament 2000). In his seminal article, “The myths of imagery”, Liddament (2000) criticises the postulation that in producing pictures, we render explicit something that already exists inside us as a sort of essence. He also criticises empirical approaches in cognitive science, in similar pursuit of a particular mental substance. For Liddement (2000), ‘imaging’ and ‘imagery’ is “not something intangible which takes place in a mysterious ‘medium’” (for example, in the mind), but instead “imaging is a doing” that “alludes to the thinkable, and this means: to the do-able” (Liddement, 2000, p. 604).

Moore (2003), in a discussion on the role of visualisation in design, argues that it is important to be critical to the implicit ‘metaphysical’ notion that lurks in theories of creativity, especially critical of specific types of visual or sensory modes of thinking whose supposed roots are found in elements of consciousness that precede perception and language (Moore, 2003). She argues that there “is no need to look for anything hidden beyond or beneath what is already there in front of our eyes,” (Moore, 2003, p. 12) and in an attempt to “demystify the art of design” she advocates a noncircumventable and opaque role of the visual in design.
Folkmann (2010) agrees, stating that “it is necessary to be critical of any metaphysical assumptions in the concepts we employ when speaking about design, imagination, and creativity. Still, it may prove productive for a discourse on creativity to address some features of the modus operandi of imagination in design” (Folkmann, 2010, p. 1). He perceives that imagination is a “structure that comes to itself in the dynamic interaction between inside and outside” (Folkmann, 2010, p. 2), in much the same way that cognition in design should not be regarded (only) as thinking but rather as an activity of inquiry and action that is flexible due to its specific function.

Within this dynamic interaction, designers construct meaning between mental settings and physical manifestations in design, which Folkmann (2010) proposes is “schematization”, a concept that “captures the cognitive, imaginative framing of reality” (Folkmann, 2010, p. 2). Taking its roots from design discourse, the term schemata has been used to describe dominant ways of addressing problem solving in the “development of a growing pool of precedent” (Lawson 2004, p. 456).

This concept of ‘schematization’ also links with the idea that design is hemeneutical and the act of designing is one of ‘positioning’ (Snodgrass & Coyne, 2006).

Folkmann (2010) proposes that there are “three general meta-conceptual concepts or settings that are effective in the design process of turning inner imaginings into products” (Folkmann, 2010, p. 3). These include: first, 1) presupposed knowledge: known versus unknown; 2) Imaginative starting point: whole versus detail; and 3) degree of focus: focussing versus defocussing. Essentially, known versus unknown involves integrating layers of meaning that are unknown, emergent and becoming, and a mental setting “embraces the openness of the interface between known and unknown may make it possible to let the inner space of imaginings develop into something new in the design process” (Folkmann, 2010, p. 4). The whole versus detail is that, in design, the whole and detail are inextricably linked; “every detail is structurally and hemeneutically bound to a totality or a whole that can perhaps hardly be fully stated. Thus, details can only be developed and understood as fragments in the light of a totality that is perhaps only on the verge of becoming
through fragmented details” (Folkmann, 2010, p. 5). In terms of focussing versus defocussing, considered in the context of imagination, Folkmann (2010) explains that:

The relationship between problem statement and solution generation defines the path from inner imagining as an adaptation of the problem statement to outward manifestation in a design solution. Thus, the attention shifts from framing as a discursive activity of naming to focussing as in the process of schematizing a way of structuring the transfer of meaning between inner imaginings and outer physical manifestations” (Folkmann, 2010, p. 7).

A process that is similar to framing, Folkmann (2010) sees that the process of focussing lies in the interface between inner consciousness and outer world.

The notion of focussing and defocussing is also referred to by Kavakli and Gero (2001), who discuss ‘defocussed attention’ or ‘remote association’ as a method of “divergent thinking which refers to the general process of thinking of unusual associations”, thus it is “important to deliberately defocus one’s attention when attempting to discover creative solutions to a problem” (Kavakli & Gero, 2001, pp. 358-9). Both Kavakli and Gero (2001), and Folkmann (2010) agree that “Absolute focussing and defocussing cannot, however, be attained simultaneously. Instead, focussing and defocussing can be present in various degrees at the same time, or a design process may involve variations in focussing strategies” (Folkmann, 2010, p. 7).

Mental models, simulation and imagining

In design and architecture, mental simulation has been anecdotally described as an activity of utmost importance. An example of one famous anecdote is where Tafel (1979) describes how Frank Lloyd Wright in 1928 developed the concept for Fallingwater, an iconic architectural residential building in the United States. The building was commissioned by Edgar Kaufmann, who kept in contact via telephone with Wright to enquire how the plans were progressing. For almost one and a half
years, Wright’s response was simply that the plans were proceeding well, although no drawings were undertaken. One day, Kaufmann called and proclaimed that he was en route, two hours and twenty minutes away. It was only at that point that Wright began sketching plans for Fallingwater; first and second floor plans, with sections, elevations and details. All were drawn up almost true to final form, apparently developed fully in Wright’s head prior to producing external representations. It was later that Wright described his design process in the following manner:

Conceive the building in the imagination, not on paper but the mind, thoroughly – before touching paper... Let it live there – gradually taking more definite form before committing it to the drafting board. When the thing lives for you – start to plan it with tools. Not before. To draw during conception or sketch, as we say, experimenting with practical adjustments to scale is well enough if the conception is clear enough to be firmly held... But if the original concept is lost as the drawing proceeds, throw all away and begin afresh. (Wright, 1928)

This reflection suggests that design concept development is able to be carried out by using only mental simulation and imagery, and that the concept perhaps should not be committed to external representations (paper or prototype) prior to a process of consolidation. This aligns with the mental model thesis proposed by Gentner (2002), where a mental model is a representation of some domain or situation that supports understanding, reasoning and prediction. Supporting this thesis, Craik (1943) was the first to propose a theory of mental models as dynamic representations or simulations of the world; since then, however, the ‘mental models’ research paradigm has not evolved substantially (Forbus & Gentner, 1997; Markman & Gentner, 2001). While there has been a number of different theories, each relies on different assumptions of the nature of the cognitive system and focus their research on somewhat different aspects of mental models.

Theories on mental models illustrate that they represent different interpretations of the possible relationship among objects and their properties based upon given information, with one approach focusing on how people perform logical reasoning tasks with mental models (Johnson-Laird, 1983). The other approach is centred on
causal mental models that are used in reasoning, which are based on long-term domain knowledge or theories (Gentner & Stevens, 1983). Several researchers have found that causal mental models rely on qualitative relationships, such as signs and ordinal relationships (Forbus, 1984; Kuipers, 1994). However, more important to this research is the fact that when forming mental models, people typically do not estimate things exactly as they would actually be, but rather a partial knowledge of the end outcome, as in the case of a designer who may have a partial knowledge of the space that they are to design.

An important feature of causal mental models is that they often allow mental simulation: being able to dynamically ‘run’ a simulation internally to observe functioning and outcome of a system or device. This ability to simulate something unknown means that an individual can predict outcomes even for situations where they have had no previous experience. The potential advantages of using a mental model in design includes the ability to reason about how physical spaces will allow for interaction under various circumstances with altered aspects without having to resort to physically constructing such a space. This ability is particularly constructive in other typically non-creative domains, such as science, as well as art and design, where uncertainty is an inescapable part of the problem space.

Essentially, one of the key components to mental simulation theories is the assumption that mental simulations help gain knowledge of the actual world through simulations of multiple possible (either past or future) alternatives (Forbus, 1984); knowledge is gained mainly through inferences (Gentner, 2002), leading to the generation of possible alternatives or predictions for future encounters with similar situations. Functionally, mental simulations may thus reduce information uncertainty.

Mental simulations are entirely subjective, operating with inexact or missing information, leading to partial, imprecise or approximate results (Forbus et al., 1997; Kuipers, 1994). Furthermore, although mental simulation can be said to be biased and prone to error in some respects, it is still a potent reasoning strategy allowing for the quick and cheap generation of approximate or imprecise knowledge in situations where the production of exact quantitative simulations is inappropriate, unavailable or impossible, such as in the design process.
Important aspects of mental simulations are the external factors that evoke or influence the use of mental simulations; mental simulations do not occur alone or in a vacuum. At times, the individual, in aiming to solve the problem, undertakes everything mentally, but eventually, mental simulations are done in the context of a physical object (such as models), sketches or drawings. Parts of the object may be mentally modified or transformed, and externalisation such as modelling or sketching, serves as both a help (providing a concrete base situation) as well as a hindrance (interference between the perceived world and the imagined world).

According to Norman (in Gentner & Stevens, 1983), mental models are representations of reality that people use to understand specific phenomena, describing them as such: “In interacting with the environment, with others, and with the artifacts of technology, people form internal, mental models of themselves and of the things with which they are interacting. These models provide predictive and explanatory power for understanding the interaction” (Norman, in Gentner & Stevens, 1983, p. 55).

Mental models are consistent with theories that link internal representations with thinking processes. Johnson-Laird (1983) proposes mental models as the basic structure of cognition: “It is now plausible to suppose that mental models play a central and unifying role in representing objects, states of affairs, sequences of events, the way the world is, and the social and psychological actions of daily life” (Johnson-Laird, 1983, p. 397).

Adding to this, Holland, Holyoak, Nisbett & Thagard (1986) suggest that mental models are the basis for all reasoning processes: “Models are best understood as assemblages of synchronic and diachronic rules organized into default hierarchies and clustered into categories. The rules comprising the model act in accord with the principle of limited parallelism, both competing and supporting one another” (Holland, et al., 1986, p. 343).

Expressed another way, mental models are psychological representations of real, hypothetical, or imaginary situations. The mind constructs ‘small-scale models’ of reality that it uses to anticipate events, to reason, and to underlie explanation (Craik, 1943). These models have a structure that corresponds to the structure of what they
represent. They are accordingly akin to architects’ models of buildings, to molecular biologists’ models of complex molecules, and to physicists’ diagrams of particle interactions. Since Craik’s (1943) original theory, researchers in cognitive science have argued that the mind constructs mental models as a result of perception, imagination and knowledge, and the understanding of dialogue.

Lawson (1980) argues that reasoning and imagining are most important to designers as a critical part of the design process. Whilst reasoning and imagining differ in that reasoning “is considered purposive and is directed toward a particular conclusion” and imagining is where the individual draws from their own experience “…combining material in a relatively unstructured and perhaps aimless way”, both are considered to be a part of the creative process of designing. He explains that even in the most structured and disciplined fields such as engineering, many design problems are solved using the combination of imaging, imagining and reasoning in this creative and imaginative process (Lawson, 1980, pp. 137-138).

While there is a reasonable body of literature focussing on imaging and mental models, very little explicitly focuses on imagining, with the exception of Folkmann (2010), Moore (2003) and Liddement (2000). Other than these authors, where there are references to imagining as in the previous examples, they are broad and vague. Having said this, where imagining is used (and used as distinct from imaging) there seems to be an implicit understanding of it as a ‘meta’ activity embracing and being supported by other activities such as imaging and mental simulation. In this regard, it invites closer exploration of the relationship between imagining and the process of creative mental synthesis emerging in more recent research.

**Creative mental synthesis**

According to Dorst (2011), “Creative design seems more to be a matter of developing and refining together both the formulation of a problem and ideas for a solution…” (Dorst, 2011, p. 434) with constant iteration between, or as described by Maher, Poon and Boulanger (1996) ‘co-evolution’ of, the “problem space” and the “solution space” (both terms coined by Newell and Simon, 1972). The process of iteration is in effect bridge building facilitated by the identification of a key concept or ‘frame’. “The ability to frame a problematic situation in new and interesting ways
is widely seen as one of the key characteristics of design thinking” (Paton & Dorst, 2011, p. 1). Where possible, it is also seen as increasingly important for this process to be undertaken collaboratively with the client and, when necessary, to enable negotiation and reframing. In research by Paton and Dorst (2011) this involved the use of metaphor and analogy, contextual engagement, and conjecture (Paton & Dorst, 2011, p. 8). Contextual engagement or immersion is regarded here as “a means not only to learn about the design situation, but also to strategically understand how to create meaningful nodes of interaction and helpful activities to facilitate reframing with a particular client” (Paton & Dorst, 2011, p. 9).

According to Kolko (2010), “Synthesis is an abductive sensemaking process. Through efforts of data manipulation, organization, pruning, and filtering, designers produce information and knowledge” (Kolko, 2010, p. 17), and abduction allows for the creation of new knowledge and insight in the complexities that the designer may have to deal with during the design process. For Kolko (2010), abduction is “the hypothesis that makes the most sense given observed phenomenon or data and based on prior experience” (Kolko, 2010, p. 3). Within the industrial design context, Kolko (2010) describes sensemaking as an attempt to understand connections and their implications for future action. Invariably because of the huge amount of data, this involves as part of the synthesis process a ‘getting it out’ or externalisation of the collected information. Incorporated with this is a process of spatialisation, and the development of a mental model of the design space to be explored and refined. In this respect, Kolko (2010) advocates externalising the entire meaning-creation process; that is, removing data from the cognitive realm (the brain) as well as from the digital realm (the computer), to the physical realm, such as a wall where the designer (and the client) can see the whole problem space and is able to prioritise, judge and forge connections between data.

The concept of ‘framing’ provides further clarification and as previously described is understood to be central to the designer prioritising, judging and forging connections. For Schön (1984), a design hypothesis “depends on a normative framing of the situation, a setting of some problems to be solved” (Schön, 1984, pp. 134-136). This usually involves a person, a setting, or an action-based goal where the designer will ‘position’ self within the space or place (mentally) and ‘enact’ through...
imagining a similar scenario, and ‘experience’ certain aspects of the space or place to be designed.

During the process of design, it is synthesis then where cohesion is revealed and clarity ensues, yet it is also a process that appears almost ‘magical’ to the outsider, as synthesis is frequently performed privately (in the head, or mind’s eye), contrary to other aspects of the design process (such as sketching and drawing) which are visible to non-designers. This stage of designing is critical and is considered to be an insular process, one where it is practised as a private exercise and “there is no visible connection between the input and the output; often, even the designers themselves are unable to articulate exactly why their design insights are valuable” (Kolko, 2010, p. 15). As an observer, this is considered to be a ‘magical process’: one where there is no apparent link between the beginning and end process of designing. From the designer’s perspective it is a deep and reflective process, and is difficult to articulate. This gap in understanding leads to an ongoing problem in design where design research and design synthesis are ‘de-valued’ as both are considered to be an ‘informal’ step in the design process. Kolko (2010) articulates it where “The design output and solutions can be unique, novel, and even exciting, but because there is no artifact-based procedural trail, the client isn’t aware of the various internal deliberations that have occurred” (Kolko, 2010, p. 17).

As current research reveals, non-design areas are showing interest in the process of creative mental synthesis. At the 8th Design Thinking Research Symposium in Sydney, Australia in 2011, there was growing interest in design thinking outside the design areas, attributed in part to a changing world and associated wicked problems. In addition to its designerly strategies for dealing with wicked problems, design is also recognised for its ability to affect change through the artefacts which it produces (Stewart, 2011, p. 2). In reviewing the papers presented at the Symposium, Stewart (2011) observes that the common thread “is an interest in design as an interpretive practice within which particular kinds of sense-making are operative” (Stewart, 2011, pp. 4-5).

Originally used as a concept to describe designers’ cognitive strategies of problem solving in the design disciplines, such as in research by Cross (1982), Lawson (1980), Nagai and Noguchi (2003) and Papantonopoulos (2004), design thinking is
emerging as a concept marketed to advance innovation in non-design areas (Brown, T., 2008; Grots & Pratschke, 2009). The concept of design thinking has also found its way into academic curricula well beyond traditional design programs; for instance, the Rotman School of Management (Toronto) in the context of the Masters of Business Administration (MBA) education, or at Stanford and Potsdam which offer design thinking education intended specifically for non-designers (Dunn & Martin, 2006; Plattner et al., 2009).

This area of design thinking is premised upon the notion that those leading a group of people should consider ‘thinking like designers’ (Dunne & Martin, 2006) or adopt a ‘design attitude’ (Boland & Collopy, 2004); thus, organisations should organise themselves like ‘design teams’ (Dunne & Martin, 2006). The premise of this is that by learning to ‘think like a designer’ one can transform the way that products are developed (this should not be confused with industrial design) the way that services are provided and how processes and strategies are carried out. Furthermore, design thinking is seen to play a key role in innovation (UK Design Council, 2009).

2.5 Summary and discussion

This chapter presented an overview of design methodology research focussing on design process, design thinking and cognition, and imagining. In terms of design process, the review pointed to early research concerned with developing prescriptive models of design in order to improve process efficiency and product performance. Underlying this was an understanding of design as a mechanistic, sequential activity. When these new models failed to achieve the desired outcomes, especially in the spatial design areas such as architecture, attention turned to better understanding the nature of the design task, and with this a new conception of designing as a heuristic, satisficing activity emerged. As the review shows, this was facilitated through research concerned with the nature of design problems and design as a (creative) cognitive activity. Design problems were identified as being ill-defined and ‘wicked’ due to their complexity and future-oriented nature demanding a generative way of reasoning involving abductive, as well as inductive and deductive, thinking. In association, increasing attention was given to imaging, visualisation and mental imaging, and more specifically, the role of mental models and simulation. While the
review revealed few specific references to imagining, recent research on creative mental synthesis appears to provide a fertile basis for ongoing research of relevance to design including the spatial design areas.

As Kokotovich (2000) pointed out twelve years ago, although much research has been undertaken in the area, there is still a need to use a more systematic methodology in order to extend the views expressed in the design literature relating to creative mental synthesis. Kokotovich (2000) argues that whilst there has been extensive research over the past thirty years in perceptual psychology, the research has not specifically addressed issues in design thinking. He proposes that “[D]eveloping a detailed understanding of creative mental synthesis will serve to support design education, and therefore the improvement of design practice. Cognitive processes are central to the process and practice of design. Consequently, it is important that some of these cognitive processes be identified and understood” (Kokotovich, 2000, p. 2).

Such a recommendation is relevant today with Paton and Dorst (2011) proposing that design education “would benefit from making reframing and briefing strategies salient for students: as a process at the project level; and, to foster expertise in creating new frames at the professional level” (Paton & Dorst, 2011, p. 14). One of their recommendations for future research is “investigating the professional meta-activities designers engage in to support fostering new frames; and understanding the different ways a frame can change” (Paton & Dorst, 2011, p. 14).

However, even with significant development over the past five to six decades, design research remains in a state of confusion (Visser, 2006a, 2006b, 2006c, 2009, 2010b). Over the past few decades, a number of movements in design methodology and research have been introduced, as discussed in depth above. These movements in design thinking and theorising have transformed over the decades, developing into various discourses and even splitting into several different directions which have very little to do with each other. Visser (2006a) argues that, to date, no significant leading theory and methodology has emerged, and this feeling is echoed by industrial design theorist Krippendorff (2006), who believes that old theories and methodologies have faded, and what remains in design discourse is an odd mixture of various older style approaches. Even more disappointing is the dearth of research
in the spatial design areas (such as architecture and interior design) reinforcing the overgeneralised view that design research undertaken in industrial design is also relevant for the spatial design disciplines. The research described in this thesis is an attempt to start to respond to these issues.
CHAPTER 3: PRESENCE RESEARCH

3.1 Introduction

As conveyed previously, the research described in this thesis commenced with an exclusive focus on imagining in design. After initial exploration of students’ experience of designing and further reading in the area of design methodology, the lack of research to do with the cognitive process of imagining became evident. This prompted additional reading beyond the design disciplines and a subsequent connection to presence research and disciplines that have been significant in shaping it such as cognitive science, engineering and computer mediated communication (CMC).

Specifically, the chapter is structured as five main sections informed largely by Lombard and M.T. Jones (2007) (Figure 3.1). The first section introduces the presence research framework and presents the historical foundations of presence and its relationship with cognition. In the second section, the various conceptualisations of technology mediated presence are discussed. The seminal texts regarding both non-mediated and non-technology mediated presence are examined in detail in section three, as are the notions of co-presence and spatial presence. In addressing the presence process, the book problem is defined as a debate that centres upon the question of whether less immersive media are capable of providing a presence experience. The fourth section examines current research on the debate surrounding presence as external perception or internal conceptual processing, underlining the potential gaps in both aspects. The fifth section focusses on mental models, the concept of the suspension of disbelief and facilitating mental simulation. The sixth and final section highlights seminal issues and constructs of potential interest to imagining in spatial design.
Figure 3.1: Literature review framework for presence research informed by Lombard & M.T. Jones, (2007).
This chapter, then, provides an overview of presence research including its history and areas of investigation that are of particular relevance to imagining, such as technology mediated presence, presence mediated by a non-technological external or internal element (such as a book or mental model), and non-mediated presence (Figure 3.1). As indicated in Figure 3.2, the review gives special attention to the role of cognition in presence research aligning with the explicit interest given in the thesis to the cognitive process of imagining. In addition, it highlights in a concluding section the perceptual/conceptual debate that currently divides the presence research community.

![Diagram of Presence Research Framework]

Figure 3.2 Literature review context for presence research

3.2 Presence Research Framework

Traditionally, the term ‘presence’ has been defined as a state of being present in a place or something felt or believed to be present; it indicates either a tangible condition when something or someone is actually present in the physical world, or may also connote a personal perception of the world (physical or virtual), embodied in a feeling or belief. It is defined as a subjective experience of ‘being’ and ‘acting’ in a virtual environment (Slater, Usoh & Steed, 1994), usually in the sense of being
in a computer-generated or computer-mediated environment. Research suggests that the presence experience depends upon certain features of the virtual environment, for example, techniques and types of interaction (Regenbrecht & Schubert, 2002). It should be noted that in early references to presence, the term telepresence is used as originally coined by Minsky (1980) to reflect its association with technology. However, the more general term ‘presence’ is generally used in the presence research community.

An overview of the historical aspects and highlights of presence research reveals that the first decade of research commencing in the mid to late 1990s was dominated by a comprehensive debate on the definition of the phenomenon of presence and an understanding of it as a psychological phenomenon that is experienced or felt (Lee, 2004; Lombard & Ditton, 1997; Lombard & Jones, 2007, 2009). Characterising and raising an awareness of presence meant that the experience is distinguished significantly from automatic and uncontrollable responses to virtual environments such as startle reflex, body sway, physiological reactions, or social responses, which have sometimes been discussed as alternative, objective measures of presence (Bailenson, Blascovich, Beall & Loomis, 2003; Freeman, Avons, Meddis, Pearson & IJsselsteijn, 2000; IJsselsteijn, de Ridder, Freeman, & Avons, 2000; Slater et al., 2006). It is important to note that this was also a period in presence research where quantitative methods were the primary methods used in order to understand the phenomenon.

From approximately 2005 to the present, research on presence has gained new momentum and a new direction. In this more recent phase, researchers are recognising that cognitive theories of spatial presence are needed. Rather than focussing on what is presence, it is now the how does presence occur that is important with qualitative methods used in conjunction with quantitative methods (Garau, 2003; Slater et al., 2008; Thomsen, 2004; Turner & Turner, 2006).

Lee (2004) stresses that one of the most important ongoing concerns in presence research is to explain the “mental mechanism that enables humans to feel presence when they use media or simulated technologies” (Lee, 2004, p. 47). Theories are currently being developed that attempt to explain which cognitive processes are involved in the perception and interaction with virtual environments, and how these
processes lead to presence (Lombard, 2011; Riva, 2011; Turner & Turner, 2011). In doing so, these theories are largely based on the proposition that unconscious spatial cognitive processes underlie the construction of a mental model of the virtual environment, which, in turn, evokes presence (Biocca, 1997, 2002, 2003; IJsselsteijn, 2002; Nunez, 2007; Regenbrecht & Schubert, 2002; Wirth, Hartmann, Bocking, Vorderer, Klimmt & Schramm, 2007).

Therefore, from the ‘definition of presence’ debate arising earlier in the field, combined with subsequent research on determinants and measurements of presence (Slater, Linakis, Usoh & Kooper, 1996; Slater & Usoh, 1993; Slater & Wilbur, 1997) and attempts to develop a deeper understanding about the process of the presence experience, a significant body of knowledge is developing. In spite of this, there appears to have been no concerted attempt to link the cognitive aspects of the design process (in particular imagining) with presence research.

Informed by Lombard and Jones (2007), this thesis proposes three main categories of presence: presence which is brought about only through technology (technology mediated presence), presence which occurs via a non technological external element (such as a book or an internally generated mental model), and finally, presence experienced when in actual physical proximity to another person or object (non-mediated physical presence) (Figure 3.3).

Figure 3.3: Presence categorisation adapted from Lombard and Jones, M. T., (2007)
The three categories conveyed in Figure 3.3 can be expanded further using Lombard and Ditton’s (1997) six conceptions of presence: social richness (the ‘warmth’ or ‘intimacy’ possible via a medium), realism (perceptual and/or social), transportation (the sensations of ‘you are there’, ‘it is here’ and/or ‘we are together’), immersion (in a mediated environment), as a social actor within medium (e.g., parasocial interaction), and the medium as social actor (e.g., treating computers as social entities).

**Presence and cognition**

Before exploring the three main categories of presence in detail and the role played by cognition, a brief discussion on the general relationship between presence and cognition is provided. Although many early studies acknowledged that presence is related in some way to cognition, a significant step in the correlation between presence and consciousness was proposed by Loomis (1992), creating a new disciplinary relationship between cognitive science and presence. However, current research within presence identifies that since Loomis’ early work, the contribution that cognitive science provides to presence research is an ongoing issue that few agree upon. To date, Riva remains the most prolific author on the relationship between cognitive science and presence. Riva’s (2009) studies within the area propose a new model in presence research where the environment (real or virtual) “...offers different opportunities and produces presence according to its ability in supporting the users and intentions” (Riva, 2009, p. 167).

Considering both mediated as well as non-mediated presence, Riva, Baccetta, Cesa, Conti & Molinari (2003) argue that the essence of presence research “is the comparison of human perceptions and responses in the context of technology with human perceptions and responses in contexts that do not involve technology” (Riva et al., 2003, p. 2). This is based upon the definition given by the International Society of Presence Research (ISPR), where ‘presence’ is a “psychological state in which even though part or all of an individual’s current experience is generated by and/or filtered through human-made technology, part or all of the individual’s perception fails to accurately acknowledge the role of the technology in the experience” (ISPR 2000).
Riva (2009) maintains that the recent outcomes of cognitive science offer a broader definition of presence that is not limited to technology where “presence is described here as a core neuropsychological phenomenon whose goal is to produce a sense of agency and control: subjects are “present” if they are able to enact in an external world their intentions” (Riva, 2009, p. 1; Riva et. al., 2006). Furthermore, the relationship between presence and action (agency) is linked through the subconscious separation of both ‘internal’ and ‘external’, and ‘self’ and ‘other’ (Riva, 2007). Presence is defined as the non-mediated perception of successfully transforming intentions in action within an external world, and social presence is defined as the non-mediated perception of an enacting other (recognising others’ intentions) within an external world (Riva 2006, 2008a, 2008b). Put simply, the presence experience is based upon the individual experience. Additionally, the more complex the task, the more likely the sense of presence experienced. Finally, maximum presence is experienced when the environment is able to support the full intent of the user. That is, the more that an individual feels that he/she can ‘act’ (sense of agency) within an environment, the greater the sense of presence experienced.

To summarise, relating presence and agency offers a conceptual framework for gaining an understanding of the relationship involving action and recognition of intentions. Presence is seen as a basic human experience encompassing everything from subconscious physiological responses through to higher-level cognitive, emotional and bodily awareness, through physical and social interaction. As such, presence research, and its link with agency provides an enormous possibility for the exploration of environments allowing different opportunities for supporting users and their intentions. However, whilst the focus is on presence and agency, there are still opportunities to scrutinise different forms of presence encompassing perception, neurological processing, cognition, interaction and emotions, affecting people and culture, especially in terms of designing. Examining the different conceptualisations of presence may facilitate development of elements which capture previously undiscovered aspects of human presence and interaction.
3.3 Technology Mediated Presence

As outlined earlier in Figure 3.3 and highlighted here in Figure 3.4, there are several forms of technology mediated presence (telepresence): social telepresence, spatial telepresence; conceptual telepresence and telepresence as perceived realism.

Figure 3.4: Technology mediated conceptualisations of presence

Technology mediated presence occurs where the mediating technology ‘invisibly’ enables a person to experience the perception of being somewhere other than where they are in reality. Minsky (1980) refers to this as telepresence. Lombard and Ditton (1997), who are cited widely in presence research literature, describe it as having the sense of ‘being somewhere’ usually in the sense of being in a computer-generated or computer-mediated environment. Further, they describe presence in terms of invisibility or transparency, as a large open window, with the medium user and medium content (objects and entities) sharing the same physical environment. “An illusion of nonmediation occurs when a person fails to perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there” (Lombard & Ditton, 1997, p. 5).

This type of presence is also referred to as ‘virtual presence’ which is defined as the creation of an illusion of presence created by artificial immersive devices; commonly affiliated with ‘virtual reality’ (VR) or ‘virtual environment’ (VE) systems, where computer programs are used to generate virtual objects and environments presented to the individual through a variety of technologies; artificial immersive input devices
are used to stimulate the senses and to create an illusion of ‘being there’ within a remote virtual environment, thus resulting in the presence experience.

During the past three decades, there has been a significant focus on research and development of media that enhance the sense of presence as it provides more accurate reproductions and simulations of reality than were previously thought possible in immersive displays, computing and network technologies and interactive computer graphics. IJsselsteijn and Riva (2003) propose that “…research interest in presence has mainly been motivated by work in three related domains: teleoperation, simulation and telecommunication” and that “…presence research offers the possibility to engineer a better user experience, to optimize the effectivity [sic], efficiency and pleasurability of the different applications. From an application viewpoint, presence research will spur the development of numerous tele-applications in home and professional environments” (IJsselsteijn & Riva, 2003, p. 7).

Presence research not only benefits the entertainment industry, but has also advanced to become common ‘currency’ in areas such as virtual environments, advanced broadcast and cinematic displays, teleoperation systems and advanced telecommunication applications.

In terms of the subcategories for technology mediated presence, Lombard and Jones (2007) depict social telepresence as a social actor within a medium. Zhao (2003) describes this as a form of human co-location in which both individuals are present in person at their local sites but are located in each other’s electronic proximity rather than physical proximity. Spatial telepresence is a feeling, a sense or a state of ‘being there in a mediated environment’. Carassa, Morganti and Tirassa (2004) propose that it is the subjective feeling or mental state in which an individual, through visual, auditory, or force displays generated by a computer, believes that they are ‘physically present’ within a virtual environment.

Conceptual telepresence differs from spatial telepresence in that it is the degree to which the individual feels involved with or absorbed in and engrossed by stimuli from the virtual environment (Palmer, 1995). Related to this is the concept of telepresence as perceived realism, which Lombard and Ditton (1997) describe as the

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extent to which a media portrayal is perceived as being plausible or ‘true to life’ in that it reflects events that do or could occur in the non-mediated (real) world. Lee (2004) describes this as the “psychological state in which virtual (para-authentic or artificial) objects are experienced as actual objects in either sensory or nonsensory ways” (Lee, 2004, p. 37).

3.4 Non-mediated (physical) presence and (non-technology) mediated presence

![Diagram of mediated and non-mediated conceptualisations of presence](image)

Figure 3.5: Mediated and non-mediated conceptualisations of presence

Non-mediated physical presence is a sensation of existence with and/or in an objective actual something; or ‘corporeal togetherness’ as defined by Zhao (2003). According to Zhao (2003), corporeal togetherness explicitly excludes technology; it is “the most primitive mode of human togetherness” (Zhao, 2003, p. 447). To interact with someone in corporeal co-presence is to interact with that person face to face. It is introduced here with (non-technology) mediated presence (Figure 3.5) because social presence can be an aspect of mediated presence and also because people who experience mediated presence are co-present corporeally with a physical reality. This sense of social presence or corporeal co-presence also occurs in design, where people engage iteratively with internal and external worlds, experiencing and intentionally orchestrating the relationship between non-mediated (physical) presence and (non-technology) mediated presence.

Non-technology mediated presence is used to describe human experience in traditionally non-immersive and non-interactive environments. It is discussed in this section in order to highlight the various aspects of presence elicited by media that is
non-technological; that is, any activity that elicits presence through non-digital means, such as reading books, dreaming or daydreaming. This form of presence is important to discuss given its potential connection to imagining in the design process.

As noted in the previous section, historically, the research on presence has been on powerful new media technologies which are able to create an illusion of ‘being there’ (for example, head mounted displays, CAVESs and VEs). In contrast, this section deals with presence that is considered to be experience based on external (or perceived as external) and/or internally generated stimuli. Where technology mediated presence describes the sense of presence in a virtual environment for a period of time, or an individual’s interaction with virtual environment’s entities, mediated/non-mediated presence could be best described as the situation where the individual fails to recognise the existence of a medium (telephone, book, or the mental imagery space). The stimuli which allow presence to occur can be either perceptual or conceptual, or even both.

As shown in Figure 3.5, the five sub-categories of non-technology mediated presence are personal presence, literary presence, spatial presence, social presence, and presence as social or cultural construction. Personal presence is the extent to which the individual feels a part of a virtual world, such as seeing the partial or whole representation of self. Literary presence can be defined as an illusion of presence created by storytelling, and this illusion is a common artistic goal for such traditional communication media as books, theatre, television, and film (Lombard & Ditton, 1997). Through text or narrative, the spoken voice, and images on film, an individual can be led to believe that they are somewhere they are not, or in the presence of people and objects that do not actually exist. Schubert (2009) defines spatial presence as “the sense of being there that applies to the experiences of spatial presence in virtual and real environments as well as to the experiences emerging from reading and remembering...irrespective of whether technology mediated the experience, or which technology was involved” (Schubert, 2009, p. 162). The terms ‘physical presence’, ‘a sense of physical space’, ‘perceptual immersion’, ‘transportation’, and the ‘sense of being there’ are all terms used interchangeably with spatial presence. Social presence, according to Heeter (1992), is the perceived
existence of others: “the extent to which other beings (living or synthetic) also exist in the world and appear to react to you” (Heeter, 2009, p. 262).

The sub-category of presence as social or cultural construction stems from a ‘cultural perspective’, where Mantovani and Riva (1999) argue that ‘reality’ is not ‘out there’ in the world, somewhere ‘outside’ people’s minds, escaping social negotiation and cultural mediation. Rather, reality is co-constructed in the relationship between people and their environments through the mediation of the artefacts. Further, they argue that this concept of presence expands the ecological approach in presence research that neglects the social and cultural dimension of experience, and that it recognises that experience is culturally mediated and immersed in a social context. The concept of presence as social or cultural construction is broken down into the following formulas:

- Presence is always mediated by both physical and conceptual tools that belong to a given culture
- The criterion for presence does not consist of simply reproducing the conditions of physical presence but in constructing environments in which actors may function in an ecologically valid way
- Action is essentially social (as knowledge in everyday situations is often distributed among various actors and various artefacts) (Mantovani & Riva, 1999)

As discussed above, Lombard and Ditton (1997) define presence as the psychological sense of ‘being there’. Related to this is co-presence, which is the psychological sense of ‘being together’ in such an environment and can be defined as a form of human co-location where the participants can see each other. Associated with this can be what Lombard and Ditton (1997), in their seminal text on presence, describe as ‘the perceptual illusion of non-mediation’, produced by means of the disappearance of the medium from the conscious attention of an individual. They explain this as “when a person fails to perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there” (Lombard & Ditton, 1997, p. 9).
The concept of non-mediated presence as the experience of ‘being there’ in ‘another world’ which is not necessarily mediated by technology can be associated with the ‘willing suspension of disbelief’ identified by Coleridge (1847); ‘reverie’ identified by Bachelard (1971); and ‘flow’ identified by Csikszentmihalyi (1990).

In terms of literary presence, the experience of reading a highly engaging novel has the ability to mentally transport an individual from the physical environment in which they are located to the environment described in the text; an individual can be totally absorbed in this experience. Building on this spatial metaphor, Green and Brock (2000) describe this phenomenon as ‘transportation’. Although Gerrig (1994) originally coined the term, Green and Brock’s (2000) conceptual definition refers to a ‘transporting effect’ or immersion into a narrative.

In their description of transportation in fictional texts, they emphasise the role of attention: “we conceived of transportation as a convergent process, where all of the person’s mental systems and capacities become focused on the events occurring in the narrative” (Green & Brock, 2000, pp. 701-702). They assume that mental imagery evoked by a story has an impact on the attitudes of the reader when it is activated in the state of high transportation, because transportation inhibits a critical scrutinising of the content and the ‘message’ of the imagery. Transportation is measured in various studies with self-report items focusing on the construction of vivid imagery, awareness of real environment, and affective involvement in the story.

Schubert and Crusius (2002) take a somewhat different stance, proposing that the sense of presence in a non-technology mediated environment is neither more nor less, but rather, is equal to presence experienced from means of technology. They suggest there is a need to acknowledge cognition as a mediator between immersion and presence, asserting that the fact that presence can emerge from both the perception of stimuli and the understanding of symbols indicates that the perceiving mental representations play a role in constructing the world in which we feel present. Schubert and Crusius (2002) assert that presence is not a direct result of immersion, but is “mediated by cognitive representations that are constructed on the basis of immersive stimuli” and that it is the “structure of this mental model [that]
determines whether the user experiences a sense of presence or not” (Schubert & Crusius, 2002, p. 1).

In comparing the definitions and descriptions of presence, it can be seen that there are both similarities, as well as differences, between the various forms of presence in different media. Essentially, the core aspect of the presence experience is the metaphor of travelling to another place. However, where the traditional engineering paradigm of presence in virtual reality environments appears to be related to a sense of actually being there, the sense of transportation in literature appears most strongly related to being absorbed by the text, in various depths. Ryan (2001) makes explicit reference to presence as an emergent property of reading, arguing that four distinct degrees of absorption are distinguished. These are: concentration, which is when the information is complex and the reader concentrates too much to be immersed (usually in the case of complex storylines); imaginative involvement which is “The split subject attitude of the reader who transports herself into the textual world but remains able to contemplate it with aesthetic or epistemological detachment” (Ryan, 2001, p. 10); entrancement, described as total immersion where the reader is caught up in the textual world so that the surrounding world fades away and the reader feels as though they are taken to the ‘world in the story’; and finally, addiction, which is the attitude and the willingness of the reader to escape from reality and being able to find a home in the textual world. It is also the condition in which a reader is so much in the grip of a textual or narrative world that they may feel compelled to interfere with certain aspects of it and experiences it not as if it were life (as a whole) but rather, as a ‘slice’ of life.

Put simply, alongside these levels of absorption, Ryan identifies that when in the grip of text or a narrative, the individual will experience spatial, temporal and emotion immersion; transportation to the geography of the narrated world; engagement with the unfolding events of the story; and identification with the characters portrayed.

Based upon the notion of transportation, Schubert and Crusius (2002) propose several theses, arguing that the psychological phenomenon of presence is the same in relation to three different ‘tools’ used to elicit presence: a virtual reality laboratory, a cinema, and a reading chair, and in all three media, the actual physical
environment (VR laboratory, cinema, reading chair) is suppressed in favour of an alternative, medially presented and cognitively construed environment. The authors also assert that in order to understand the book problem (discussed later in this section), there remains the necessity to acknowledge the role of cognition as a mediator between immersion and presence: “The fact that presence can emerge both from the perception of visual stimuli and the understanding of symbols shows the necessity of another layer in a theoretical model of presence, namely that of mental representations” (Schubert & Crusius, 2002, p. 4).

This notion is also supported by Schubert, Friedmann and Regenbrecht (2001), who suggest that although users report presence in a virtual environment or presence in a fictional narrative, this experience is mediated by mentally constructing an environment surrounding the body. Furthermore, Schubert and Crusius (2002) state that presence in virtual reality, film and text all diverge with regard to the amount of spatial presence and involvement, and books can produce presence because they use the power of narration. Literature requires narration in order to produce a sense of transportation, and film strongly profits from it, although film can do without a narrative (Burch, 1990). The sense of ‘being there’ can also occur in readers of texts, because readers can imagine very vividly being present in the world that the narrative of the book creates. More precisely, readers may construct a mental model of their bodies and of possible actions in the environment described by the book (Biocca, 2003).

Glenberg (1997) integrates mental models and possible actions within the ‘embodied cognition’ framework. Mental representations of mediated spaces, which can include assumptions of what kinds of actions are possible in a given space are required for spatial presence, and in most cases, spatial presence is an experience which can be enriched by (but does not completely depend on) external (media-based) information such as visual, auditory, haptic, or proprioceptive impulses and feedbacks (Gibson, 1973; Kebeck, 1997). Proprioception is the sense of the orientation of one’s limbs in space. This is distinct from the sense of balance, which derives from the fluids in the inner ear, and is called equilibrioception. The more senses a media environment activates in its users the more likely it is that the receivers will feel like they ‘are’ in the environment.
One argument for the capacity of books to elicit a sense of presence is the superb aesthetic experience of literary texts, which can include incredibly detailed and vivid portrayals of spatial configurations. Several examples of this include the stories of Marco Polo, the works of J. R. R. Tolkien, J. K. Rowling and C. S. Lewis.

Gysbers, Klimmt, Hartmann, Nosber and Vorderer (2004) argue that if spatial presence is known to occur in users of non-immersive media of books, direct sensory experience cannot be the only medium of presence and “higher-order mental activities such as cognitive involvement and imagination” are important for the facilitation of spatial presence (Gysbers et al., 2004, p. 13).

Advancing the notion of spatial presence is the conceptual model proposed by Vorderer, Wirth, Saari, Gouveia, Biocca, Jäncke, Böcking, Hartmann, Klimmt, Schramm, Laarni, Ravaja, Gouveia, Rebeiro, Sacau, Baumgartner, and Jäncke (2003) who propose that the presence experience occurs as a two-step process and can be experienced across various media but more importantly, including during reading. The authors propose that “readers generate a mental representation of the spatial environment portrayed in the text” (Vorderer et al., 2004, p. 13) and that they do so by combining text-based knowledge and knowledge-based information in order to create a spatial situation model (SSM) of the environment described in the text. This process is explained as a method where an individual processes space-related information included within the text (which is the bottom-up component) and by adding spatial images with space-related knowledge already available in the mind before exposure to the text (the top-down component). Put simply, readers combine text-based and knowledge-based information to create a SSM. This is illustrated in Figure 3.6 below as part of the MEC model of spatial presence.
However, spatial presence only occurs if the individual considers self to be actually located within the SSM and no longer believes self to be part of the real environment. Therefore, it is not enough to simply imagine how lovely an environment would look like, but rather, the person must actually regard themselves as physically there within that environment.

Based upon this model, experimental studies were carried out by Gysbers et al. (2004) where the assumption was that the more spatial descriptors and instructions for the imagination would mean an increase in spatial presence for readers of a text. The results, however, indicated that the findings of the study only partially supported the assumptions and that the ‘strength’ of the SSM was not an important factor.

The Third Pole Proposal

As described above, presence is not only dependent upon and aided through the use of digital media, but in a non-mediated environment it has been described as ‘the willing suspension of disbelief’ (Coleridge, 1847); of being engaged by the representations of an imagined virtual world. Biocca (2003) argues that mediated presence is actually not as persuasive as non-technology mediated presence, and
that the traditional concept of presence has not considered the notion of mental imagery space. He argues that:

The compelling sense of presence in virtual environments is unstable. At best it is fleeting. Like a voice interrupting a daydream in the imaginal environment, presence in the virtual environment can be interrupted by sensory cues from the physical environment and imperfections in the interface ... At one point in time, users can be said to feel as if they are physically present in only one of three places ... the physical environment, the virtual environment, or the imaginal environment. (Biocca, 2003, p. 21)

Traditional presence research postulates that presence occurs when the individual’s experience oscillates between the physical world and the virtual world. However, Biocca (2003) argues that this does not account for the ‘physical reality problem’: the ‘dream state problem’ and the ‘book problem’, hence, the third axis of mental imagery was proposed, as illustrated in Figure 3.7.

![Figure 3.7: The oscillation of presence, in physical, virtual and imaginal environments. Adapted from Biocca (2003)](image)

According to Biocca (2003), a sense of presence can also occur when individuals have the impression that they have ‘withdrawn’ from physical space into a purely imagined space. This experience happens when the individual withdraws ‘focal attention’ from incoming sensory cues, and instead chooses to attend to ‘internally
generated mental imagery’. Furthermore, dreaming and daydreaming also reveal a space where one may feel present: the imaginary environment. “We can say that the user is present in the internally simulated, imaginal environment when the user:

- has withdrawn focal attention to incoming sensory cues,
- is attending to internally generated mental imagery,
- has diminished responsiveness to sensory cues from either the physical environment or the virtual environment” (Biocca, 2003, p. 6).

The mind is also capable of constructing convincing spatial environments in dreams as well as hallucinations and daydreaming (although the latter two are usually to a lesser degree). Within these environments, an individual consciously experiences a sense of moving through space, for example, interaction with objects or people or running from something that induces fear. Biocca argues: “Clearly in a dream state we are present in a spatial environment. But it is also clear that this environment has nothing to do with technology” (Biocca, 2003, p. 7), and that dreams use a form of cognitive ‘simulator’, which is the generator of mental imagery that makes use of cognitive resources used in perception (Biocca, 1997; Kosslyn, 1980). However, where typical states of presence depend on incoming sensory stimulation, the mental spatial simulation is mostly constructed from memory, although it is believed that in a dream state, cognitive simulation can be a response to environmental stimuli.

In the field of virtuality research, Biocca (2003) argues that research on presence has been focused toward a ‘two pole model’, where “the two pole model of presence posits that presence shifts back and forth from physical space to virtual space” (Biocca, 2003, p. 1), and although the two pole model may be useful in initial engineering research on remote operated telerobotics or telepresence, the model was erroneously generalised to all media and became a cognitive theory of presence (Biocca, 2003).

The original ‘two pole model’ of presence only considers virtual and physical spaces, but not imaginary spaces, argues Biocca, who proposes that the ‘three pole model’ allows for the role of mental imagery space. Furthermore, the two pole model
fails to explain instances of high presence in media of low immersion, such as when one experiences a sense of presence while reading a novel (the book problem), as well as instances of low presence in physical reality, such as when one is present in a physical place but is relatively unaware of the place because they are mentally focused on something other than the immediate environment (the physical reality problem).

In proposing the three pole model, the ‘mental imagery space’ can be accounted for, and in addition, this ‘third pole’ allows spatial cues to be generated by mental imagery in addition to virtual or physical imagery. This mental imagery space, central to mental model development, explains why media of low immersion are capable of fostering a sense of presence in users.

In terms of mental imagery, Durand (1993) argues that “imaginary is the ‘implicate’ order through which all understanding necessarily passes, and even all explanations of individual or collective human behavior as well” (Durand, 1993, p. 17). Feshbach (1976) concurs: “an impressive amount of daily cognitive activity is fantasy in nature” (Feshback, 1976, p. 71). Regarding the overall role of imagination in cognitive activities, Kant (1933) argues that imagination is a necessary ingredient of the process of perception, distinguishing imagination (the power of synthesis) from both sensibility and understanding, and treated it as a separate faculty or ‘subjective source of knowledge’ (in Pendlebury, 1996). The representation of objects in the form of mental images is based upon the same cognitive mechanisms that are involved in the perception of those objects.

Mental imagery (occasionally referred to as visualisation, or ‘seeing in the mind’s eye’) is an experience that resembles perceptual experience, but which occurs in the absence of the appropriate stimuli for the relevant perception (Finke, 1989; McKellar, 1957). These experiences are very often understood by the individual as echoes or reconstructions of actual perceptual experiences from their past; at other times they may seem to anticipate possible, often desired or feared, future experiences.

The imagining process is not usually conscious, and has been considered by researchers distinguishing between ‘knowledge by acquaintance’ versus ‘knowledge
by description’, or experiential versus rational cognitive systems (Buck 1999; Epstein & Pacini, 1999). Mental images have an impact on an individual’s information processing because, at times, it resembles regular perceptual processes and moreover, it is involved in memory storage and retrieval as well as in emotional experiences (Lang, 1979). Lang considered the image as an active response process and an emotional experience, rather than a stimulus in the head to which the individual responds.

In terms of the presence experience, ‘induced imagery’ (or imagination, or fantasy, or daydreaming) is combined with the actual mediated message in producing the final mental representation or response; imagination becomes part of the perceiving process itself (Palmgreen, 1971).

With presence research and its community, the discussion surrounding ‘the book problem’ encapsulates both the perceptual and conceptual perspectives in presence. The essence of the debate is the question whether less immersive media (such as text or comic art) are capable of inducing a presence experience. Biocca (2003) points out that the heart of the ‘book problem’ rests with the ‘sensorimotor immersion assumption’ which posits a direct correlation between the level of immersion of the medium and the level of presence experienced by the user:

If sensorimotor immersion is the key variable that causes presence, then how do we explain the high levels of presence people report when reading books? Books are very low fidelity, non-iconic media and are extremely low on all sensormotor variables identified as causing presence: extent of sensory data, control of sensors, and ability to modify the environment.

(Biocca, 2003, p. 4)

There are also a number of other theorists and researchers who recognise this incongruity (Banos, Botella, Guerrero, Liano, Alcaniz & Rey, 2005; Gysbers et. al., 2004; O’Neill & Benyon, 2003; Pinchbeck & Stevens, 2005; and Schubert & Crusius, 2002). Biocca (2003) notes that “most [theorists] see the illusion of presence as a product of all media” and that “few theorists argue that the experience of presence suddenly emerged with the arrival of virtual reality” (Biocca, 2003, p. 4).
14); even those researching outside the domain of presence research argue that “low resolution media does not mean a low-resolution experience” (Phillips, 2000, p. 82).

Given this, Biocca proposes that shifts in presence (occurring when the individual experiences ‘lapses’ in presence during an experience; put simply, moving from physical space to virtual space) are likely to have ‘predated media’. This space allows the addition and incorporation of spatial attention and mental imagery in the account of presence, and thus the ‘third pole’ is introduced. Spatial models, proposes Biocca, have similar properties to those of real and virtual sensorimotor spaces, and spatial presence, generated by mental imagery spaces, oscillates among three sources of spatial cues: real, virtual and self-generated (imaginal).

Schubert and Crusius (2002), in their formulation of the five theses discussion around the book problem, differ in their starting point of discussion on the issue, stating that presence is a cognitive construct created from immersive stimuli, rather than Biocca’s claim that presence is a direct function of immersion. That is, the structure of a mental model determines whether or not an individual experiences a sense of presence. This means that in acknowledging this, the psychological phenomenon is the same in media, VR, film and text, and that the physical environment is “suppressed in favour of an alternative, medially presented and cognitively construed environment” (Schubert & Crusius, 2002, p. 262). Taking this into account, it is therefore important to acknowledge the role where cognition acts as a mediator between immersion and presence; the media should be regarded as the raw source of the mental model construction, but not directly responsible for the sense of presence. This means that the media allows the mental construction of an environment around the body, but it is the cognitive construct of the mind that permits presence to occur.

Schubert and Crusius (2002) offer a resolution to the paradox and propose a theory acknowledging a ‘cognitive layer’ to the experience of presence wherein all incoming perceptual stimuli do not give way directly to a sense of presence, but rather apply toward the construction of a mental model which may or may not induce presence depending on the level of detail. Presence is not a direct function of immersion; rather that immersion is dependent upon the source of a stimulus with which users create a mental model. It is the mental model that individuals create –
which theoretically could be based on cues in virtual reality, television or books – that determines whether or not presence is felt (Schubert & Crusius, 2002). They posit that presence has been studied in various contexts under different names, including the ‘diegetic effect’ in film (Burch, 1979; Tan, 1996) and ‘transportation’ in narrative (Gerrig, 1993; Green & Brock, 2000).

An important argument proposed by Schubert and Crusius (2002) is that by differentiating between the construction of a spatial mental model and the attention devoted to this construction, some differences can be seen between modalities. Virtual reality, for instance, has a high potential for both construction of mental models, and therefore spatial presence, and for involvement (or attention), while literature has a high potential for involvement, but a weaker potential than both films and virtual reality for spatial presence (Schubert & Crusius, 2002).

Pinchbeck and Stevens (2005) support the conceptual view of ‘the book problem’, claiming that “the book problem should come as no surprise and rather than being an issue, should be taken as demonstrating that virtual environments and other media share the capacity to influence an organism’s representation of its surroundings” (Pinchbeck & Stevens, 2005, p. 223). However, Waterworth and Waterworth (2003b) strongly oppose the conceptual view, asserting that presence is an external/perceptual phenomenon, and that the book problem is “a confusion between sense of presence and emotional and/or intellectual engagement in internal, imagined space” (Waterworth & Waterworth, 2003b, p. 1).

This poses an interesting debate, and the oppositional quality that the conceptual and external views and perspectives on the book problem have with respect to each other “reflects a fundamental difference in the understanding of what presence is and how it is constituted” (Jones, M.T., 2008, p. 30).

All in the Mind

The notion of being “lost in a book” is not a new discussion (Green & Brock, 2002; Green, Brock & Kaufman, 2004; Ryan, 2001) and the power of narrative has been documented – although not in great detail, according to Turner and Turner (2011), who argue that the book problem “is all in the mind” (Turner & Turner, 2011, p. 1): “Presence can be thought of as either the consequence of physically being-in-the-
world or the product of technology which substitutes the real for the virtual. In both cases presence is dependent on sensory input” (Turner & Turner, 2011, p. 1).

Despite Biocca’s (2002, 2003) discussion of ‘the book problem’ and the three-axis proposal, there are few in-depth studies and no agreed resolution of it, according to Turner and Turner (2011). Even with the inclusion of the third pole, Turner and Turner (2011) argue that there are still a number of unresolved questions. The first concerns the status of the other aspects of presence such as engagement, raising the question: which of the three axes contributes to the spatial presence experience? The second is: what exactly causes oscillation between the three poles (mental imagery space, virtual space, and physical space)? The final question is: why does imagination fade? In proposing these questions, Turner and Turner suggest: “Without a treatment of this movement, the three pole account remains a static account of spatial presence which flips from one state to another” (Turner & Turner, 2011, p. 2).

In response to the Schubert and Crusius (2002) five theses discussion around the book problem (where they suggest that presence is a cognitive construct created from immersive stimuli, rather than Biocca’s claim that presence is a direct function of immersion), Turner and Turner (2011) argue that this raises an interesting question: how does one become ‘lost’ in a book? If, “to understand the book problem is to understand the nature and creation of the mental model” (Turner & Turner, 2011, p. 3), then the power of narrative should be examined.

Ryan’s (2001) theories on narrative and presence (discussed above) illustrate that there is a cognitive link between narrative and presence; additionally, there is evidence that the reader creates a ‘textual space’ (Blackler, 2007) and is transported to story worlds by combining individual experiences and spatial cues, which together evoke mental imagery. However, there is still “sparse empirical work on being ‘lost in a book’”, and there are still “few firm data as to why (as contrasted to how) the written word is as powerful as full-spectrum virtual reality as a means of transportation” (Turner & Turner, 2011, p. 3). Taking this into consideration, they argue that “the phenomena of experiencing texts, on the one hand, and VR, films, and games on the other are fundamentally different” and the reasoning behind this is
“because of the differences in the nature of the underlying cognitive and neural representations which mediate them” (Turner & Turner, 2011, p. 3). In order to illustrate this point, Clark’s (1997a, 1997b) theories on cognitive science regarding ‘weak’ and ‘strong’ representations are illustrative.

A weak representation is that of an internal state that is “capable of bearing information about an external object only when that object is in close proximity” (Turner & Turner, 2011, p. 4). For example, an animal will be provided with quick feedback through what Clark describes as ‘information and control systems’ regarding a predator (the local external object) and thus will interact with that local object effectively, enabling a fight or flight mechanism in the animal. These ‘systems’ bear information about, and correlate with in a deliberate fashion, features of external objects. If the external object fades away and becomes absent or distant, the representation falls ‘silent’, but can be “stored off-line for future use or combined with other representations to form internal maps of the external world” (Turner & Turner, 2011, p. 4). In the case of media such as virtual reality, films and games, a person requires the external object (the source of the information – such as a game) to be within close proximity if presence is to be experienced.

On the other hand, a strong representation is considered to be the most genuine representative and the basis of cognitive processes; it is defined as “an information-bearing state that is serviceable even if its source object becomes distal or absent” (Turner & Turner, 2011, p. 4). Strong representation is “being ‘de-coupled’ from the immediate world and thus stand[s] for things when they are removed from us (or us from them)” (Turner & Turner, 2011, p. 6). Put simply, narrative or text (such as books) require the individual to use mental imagery based upon spatial descriptions to create a “textual space” (Blacker, 2007, in Turner & Turner, 2011, p. 4). The narrative itself is not the source of representation; rather, it is the mental imagery that the person ‘constructs’.

Taking this into account, Turner and Turner (2011) consider that narrative is considered to create strong representation, but media such as virtual reality, films and games create weak representation: “the nature of the representation is
independent of its medium or substance – what matters is how available it is/they are” (Turner & Turner, 2011, p. 5). Put simply, in considering the diverse set of research and literature on neuroscience, Turner and Turner (2011) argue that “the very same neural structures and processes are responsible for processing real and imagined stimuli” (Turner & Turner, 2011, p. 5) and that evidence suggests that when reading text, watching a movie, dreaming, or participating in a virtual environment, an individual experiences the same neural and cognitive processes.

In conclusion, Turner and Turner (2011) argue that the book, dreaming and real world ‘problem’ only developed due to the consequence of the “pervasive engineering paradigm in presence” (Turner & Turner, 2011, p. 6). In other words, the ‘problem’ with non-mechanical media – such as books, text, daydreaming – is that ‘traditional presence research’ argued that as there was no external device involved – such as a head mounted display – presence cannot be possible. Furthermore, they assert that whilst Biocca (2003) was correct that dreaming, real world, and books can create a sense of presence, he was incorrect in his proposition that imagery (the third pole) is the missing component in the original two pole model (where presence oscillates between the real and virtual). Rather, they concur with Pylyshyn (in Kosslyn et al., 2001) who proposes that mental images are not ‘images’ at all, but rather rely on mental descriptions that are no different than those that underlie language: “the pictorial aspects of imagery that are evident to conscious experience are entirely epiphenomenal” (Turner & Turner, 2011, p. 7). Therefore, there is no book problem, as the brain does not distinguish between the real and the imagined, “Nor is there a dream problem or a physical reality problem because all of these diverse sources of ‘stimuli’ are processed by the same parts of the brain. And the same parts of the brain give rise to very similar kinds of experiences – QED, no book problem” (Turner & Turner, 2011, p. 7).

Even with the ongoing debate regarding presence in non-technology mediated space (and including the book problem), Turner and Turner (2011), Biocca (2002, 2003), Schubert and Crusius (2002) have all been have instrumental in discussion regarding the possibility of experiencing presence in a seemingly very low immersion space, and thus the possibility of experiencing presence in an imagined space.
3.5 The Presence Divide

As this study focuses upon the conceptual processing of imagining in the design process, and, in turn, an individual’s sense of being within an imagined space, it is deemed necessary to analyse the two separate conceptualisations of presence: the external/perceptual view of presence, and the internal/conceptual view of presence. Whilst this thesis is not focussed upon exploring the depths of immersion in narrative environments, what is important is the notion that presence may be elicited from media that are not digital and that presence may be experienced as an internal conceptual phenomenon as well as externally or perceptually.

A major distinction among presence definitions concerns whether presence is seen as an exclusively external/perceptual phenomenon or an internal/conceptual phenomenon. For example, Waterworth and Waterworth’s (2001) definition of presence as “a conscious emphasis on direct perception of currently present stimuli rather than on conceptual processing” (Waterworth & Waterworth, 2001, p. 211) takes a clear stance on the side of external perception, whereas Biocca et al. (2003), in their definition of presence as “the phenomenal sense of ‘being there’ including automatic responses to spatial cues and the mental models of mediated spaces that create the illusion of place” (Biocca et al., 2003, p. 459) takes the opposing internal/conceptual view.

To date, the seminal text in the field is M.T. Jones (2008, 2009), who has provided a comprehensive overview on both views of presence. This informs the discussion below.

Much debate has risen in presence research and there still remains a significant distinction to date among presence definitions concerning presence as an exclusively external/perceptual phenomenon, or an internal/conceptual phenomenon. For instance, one such example used by M.T. Jones (2008, 2009) is Waterworth and Waterworth (2001, 2003a, 2003b), who define presence as “a conscious emphasis on direct perception of currently present stimuli rather than on conceptual processing” (Waterworth & Waterworth, 2001, p. 211) taking a clear position on the side of external perception. Although Waterworth and Waterworth are not the only authors in adopting this perspective, to date they provide the most in-depth and thorough
theoretical argument in favour of it. It is their research that shapes the next section discussing the external/perceptual perspective of presence.

The Biocca et al. (2003) definition of presence as “the phenomenal sense of ‘being there’ including automatic responses to spatial cues and the mental models of mediated spaces that create the illusion of place” (Biocca et al., 2003, p. 459) takes an opposing view to Waterworth and Waterworth, stating that presence is an internal or conceptual process and is not external perception. The primary source of contention between these opposing views is ‘the book problem’, which was described in the previous section. Biocca (2002, 2003) and M.T. Jones (2008, 2009) still remain leading authors in the field of presence research who argue in favour of the internal/conceptual model of presence. To date, M. T. Jones’ (2008, 2009) seminal research on the review and framework of the internal/conceptual and the external/perceptual divide is the most comprehensive surrounding the discussion.

In proposing that presence may be more conceptual or internally influenced, Weibel, Wissmath & Mast (2011), in their study on the relationship between mental imagery and enjoyment, found that mental imagery ability plays an important role in presence and enjoyment, whereby their particular role strongly depends on the medium. They conclude that individual mental imagery abilities are an interesting source of information when studying media effects and presence. They suggest that future presence research should consider imagery as a potential confounding variable in the presence experience.

On the other hand, Wirth et al. (2007) propose that “spatial imagination becomes more relevant if the mediated representation of the space is less intuitive and more fragmented (e.g., when reading textual descriptions)” (Wirth et al., 2007, p. 502) and this aligns with Wallach, Safir and Samana (2010), who argue that imagination does not have a significant impact on presence in sensory-rich environments. Jacobson (2002), however, suggests that imagery abilities may play a role when sensorial cues are less available, and they can, to some extent, stand in for the missing perceptual information (Jacobson, 2002), and this is the case with reading books. Despite the absence of any immediate perceptual stimulation, the reader is able to experience a high degree of immersion (Green, Brock & Kaufman, 2004).
According to simulation theory (Oatley, 1994), the story becomes convincing and enjoyable because the readers create the plot in their mind based on their own experiences. Mental simulations run on in the mind while reading, and imagined worlds are created, which allow for immersion in the narrative of a book (Oatley, 1994). Accordingly, Green, Brock and Kaufman (2004) assume that individuals with good visual imagery abilities are able to immerse themselves more in books than in visual media, suggesting that presence is more internal than external processing.

**Perceptual Presence**

In describing the philosophical roots of the external or perceptual view of presence, Biocca (1997) observes: “Many immersive virtual reality designers tend to be implicitly or explicitly Gibsonian” (Biocca, 1997, p. 2). What Biocca refers to here is the sense that many start with the assumption that no pre-existing knowledge of the world is necessary in order to make sense of it, as presence within an environment is constituted through direct perception. To quote Gibson: “The young child does not need to have ideas of space in order to see the surfaces around him” (Gibson, 1979, p. 304). As such, this assertion follows Gibson’s argument that human visual perception evolved based upon the extraction of variants from the flux of the environment. In other words, thinking that visual perception requires predetermined, static concepts is in fact incorrect, because our system of visual perception evolved within perpetual flux; we perceive objects from mobile senses and objects, such as our moving eyes, our moving head on a moving body, and we perceive aspects of a mobile environment. According to this theory, only the extraction of the unchanging aspects of the environment is necessary to comprehend and apprehend the surrounding world (Biocca, 1997).

Waterworth and Waterworth (2001, 2003a, 2003b); Waterworth et al. (2001); Riva and Waterworth (2003); and Slater et al (2003) have all presented significant theoretical and empirical evidence that supports a view of presence that is based exclusively on external or perceptual phenomena. As mentioned above, the following debate on the external or perceptual perspective is based principally on the work of Waterworth and Waterworth (2001, 2003a, 2003b), not because they are alone in adopting this perspective, but because they have articulated the most thorough theoretical argument in favour of it. It should be noted that this perspective
is widely prevalent within the presence community and is found in the predominantly engineering, psychology and communication foci in journals such as *Presence: Teleoperators and Virtual Environments* (Durlach & Slater, 1992), *Cyberpsychology and Behaviour*, and *Journal of Computer-Mediated Communication*.

The argument for justifying the external/perceptual perspective is through examining presence as part of the human evolutionary history (Waterworth & Waterworth 2003a, 2003b). These authors draw a distinction between ‘core consciousness’ (refer Damasio, 1999) and ‘extended consciousness’, suggesting that core consciousness is what we have in common with all conscious creatures, enabling understanding of our immediate concrete environment; extended consciousness is a capability distinctive to humans, allowing us to imagine possibilities and consequences as well as the ability to plan for the future. What is essential to the capacity of extended consciousness is the ability to distinguish between the domains of core consciousness (that is, perception of the immediate physical environment) and extended consciousness (that is, imagination), since to confuse the two would be dangerous and affect humans in terms of the ability to evolve:

> Viable organisms must be able to tell the difference between an imagined future situation and the actual, present, external situation. Confusions of the two indicate serious psychological problems, problems which, until recent times, would have prevented survival and the passing on of this condition. Simply put, if we react as if the external world is only imaginary we will not survive long (think of this the next time you cross a busy street). And if we think that what we are merely imagining is actually happening, we may omit to carry out basic activities on which our survival depends. We are suggesting that presence is the feeling that evolution has given us to make this vital distinction. (Waterworth & Waterworth, 2003b, p. 4)

These authors maintain that it is the sense of presence that distinguishes the difference between extended consciousness and core consciousness, with presence being within the domain of the latter.
**Presence and Absence**

Earlier research by Waterworth and Waterworth (2001) supports the view that presence is strictly perceptual and they propose that the term ‘absence’ should be used for activities such as imagining and thinking. They define that absence is “characterized as a psychological focus on conceptual processing, and presence as a psychological focus on direct perceptual processing (of things that are present in the current environment, whether real or virtual)” (Waterworth & Waterworth, 2001, p. 203). Further to this, they put forward a metaphor of the mind being a “two-room apartment” (Waterworth & Waterworth, 2001, p. 205), setting up presence and absence in an oppositionally and mutually exclusive arrangement by using the imagery of a sectional view of two adjacent rooms with a hanging light situated at the top of the doorframe between the rooms. The room on the left represents concrete processing (presence) where the body and world are represented as being; whilst the room on the right represents abstract processing (absence), where concepts and memory are represented as doing. The light areas represent conscious and the areas in darkness, unconscious.

Imagining if the lamp (which symbolises conscious thought) could be shone into one room or the other (but not simultaneously), suggests that consciousness is a zero sum game and that the concrete and abstract realms of thought compete as thus: “Although dreams, daydreams, images, fantasies, and other mental experiences may be extremely vivid, they are in competition with the experiences underlying presence in real or virtual worlds. Put simply, you cannot feel present in a virtual world, or in the real one, while also being lost in thoughts, dreams, or fantasies” (Waterworth & Waterworth, 2001, pp. 206-207). Therefore, following this line of reasoning, if one is conscious of the immediate world outside of the body, one is considered present, and if one is mostly conscious of one’s own thoughts, they are absent.

In presenting the three dimensions of presence (focus, locus and sensus) (Waterworth & Waterworth, 2001), it is apparent that only two (sensus and focus) either enhance or detract from the experience of presence. Locus only distinguishes whether attention is directed toward the physical (real) or virtual (artificial) external worlds. Both are capable of producing a sense of presence. Sensus is the level of consciousness ranging from unconsciousness or asleep (absent), to fully alert.
(present); and focus is the variable that distinguishes concrete processing (presence) from abstract processing (absence).

In terms of testing external/perceptual presence, there have been numerous validation tests, most notably, Waterworth and Waterworth (2001) and Waterworth et al. (2001). Others include Banos et al. (2005) who measured the telepresence levels of participants as they explored a virtual park or an imagined park. These examples back up the enduring criticism levelled against the internal/conceptual view of presence, that the term ‘presence’ is becoming more conflated with the more general and already well-researched area of conscious attention. In fact, Waterworth and Waterworth (2003b) note that “in trying to solve the so-called book and dream-state problems the baby of presence has been thrown out with the bathwater of conscious attention; there is nothing left for the concept of presence to do” (Waterworth & Waterworth, 2003b, p. 1).

**Criticisms of the external/perceptual view of presence**

The external/perceptual view of presence endorsed by Waterworth and Waterworth and others sets up a logical criterion for discriminating between the experience of presence and ‘absence’; it also leads to an understanding of the factors and contexts that enhance and detract from the experience of presence. Conversely, it contains a number of implicit assumptions that efficiently steer clear of the more complex examination of cognition that may be prompted if made more explicit. This ‘logical’ criterion sits more neatly with the ‘hard sciences’ (such as engineering), which depend on more quantifiable phenomena, rather than the ‘soft sciences’ (such as design and the humanities), which are more open to phenomena that are qualitative based.

In critiquing Biocca’s ‘three-pole model of presence’ (2003), Waterworth and Waterworth (2003b) tacitly take for granted that the only role conscious attention has to play is as a necessary precondition of the presence experience. In terms of the sensus dimension, conscious attention serves solely to permit the prerequisite perceptual resources to be allocated to the immediate surrounding environment. This hidden assumption is that conscious attention occurs independently of cognition, which, according to this perspective, is not a determinant of presence, but rather is of
the opposing condition referred to as ‘absence’. The key issue here is that it is difficult to define conscious attention without in some way referring to cognition.

An example of this is Hu, Janse and Kong (2005), who provide a typical definition of attention as “a cognitive process of selectively concentrating on one thing while deliberately ignoring other things” (Hu, Janse & Kong, 2005, p. 4). Wu (2011) further defines conscious attention:

Perceptual attention is essential to both thought and agency, for there is arguably no demonstrative thought or bodily action without it. Psychologists and philosophers since William James have taken attention to be a ubiquitous and distinctive form of consciousness, one that leaves a characteristic mark on perceptual experience. As a process of selecting specific perceptual inputs, attention influences the way things perceptually appear. It may then seem that it is a specific feature of perceptual representation that constitutes what it is like to consciously attend to an object. In fact conscious attention is more complicated...the phenomenology of conscious attention to what is perceived involves not just a way of perceptually locking on to a specific object. It necessarily involves a way of cognitively locking on to it as well. (Wu, 2011, p. 1)

Therefore, deliberate ignoring and selective concentration are activities that require cognitive effort. The matter of conscious attention stems from a larger problem with the external/perceptual position: the denial of the role that cognition plays in perception. Of course, it is possible for the presence experience to rely upon cognitive processes and conscious attention without being confused by them. However, as Ryan (2001) notes: “It [the mimetic concept of immersion/presence] applies to novels, movies, drama, representational paintings, and those computer games that cast the user in the role of a character in a story, but not to philosophical works, music, and purely abstract games such as bridge, chess and Tetris, no matter how absorbing these experiences can be” (Ryan, 2001, pp. 14-15). In the first set of examples, content tends to be narrative and to portray natural environments, whereas, in the second set of examples it is more abstract. The important aspect is
that all involve both cognition as well as perception. The distinction that determines the presence experience should not be made between cognition and perception, but rather, among the contents of cognition.

In the discussion that denies the role that cognition plays in perception, Waterworth and Waterworth (2003a) maintain that a significant criterion for the sense of presence is the experience of an external, sharable world that yields the same perceptions among different individuals. This argument itself poses questions raised by phenomenologists and psychologists alike, but whilst attempting to make clear the distinction between a virtual or real world and an imagined world, they note that “The virtual world is the same for everyone who acts in it, just as the real world is,” yet this conflicts with their own admission qualifying that “our experiences and reactions differ” (Waterworth & Waterworth 2003, p. 8).

Another issue with the external/perceptual view of presence is the use of the term ‘absence’ which describes non-presence in conceptual processing, illustrated in Figure 3.7 above. Although labelling this conceptual space as ‘absence’ makes a greater case for the distinction between ‘external’ and ‘internal’ perspectives, as well as the presence concept, there is a risk that the deeper underlying phenomenon may be overlooked for the sake of simplicity. Within the area of memory processing and dreams, where previously experienced physical locations can be recalled, the argument for the ability to invoke presence can be made. In other words, the person, through recalling the space, or experiencing the space in the mind’s eye, can actually feel as though they are there. Many individuals have had the experience of dreaming about something, and, at the time, it seemed completely real.

Rassin et al. (2001) describe their study based upon dreaming where a considerable amount of undergraduate students reported the experience of false memories based upon the inability to discriminate between perceptually realistic dreams and waking reality. If these phenomena are considered to be absence, based upon their conceptual nature, it would seem that an understanding of presence as a subjective psychological state is no longer salient as it is now determined based on subjective location of the body, regardless of where the mind is focused.
When examining the literature, it becomes apparent that the notion of absence may have been derived from the term ‘absent minded’; when an individual undertakes difficult abstract reasoning, time passes quickly, and little attention is paid to one’s own body. It is a state where we do not feel present in the world (Waterworth & Waterworth, 2001); whereas it is argued that when our conscious processing load is light, time passes quickly and one feels highly present in the surrounding environment. However, this raises the question of the dichotomy of ‘being absent’ and ‘being present’. Even whilst a person is working though deeply abstract processing and may feel absent from the surrounding world, it is still possible that they may feel present in a world that is ‘not of this world’.

**The external/perceptual paradox**

Criticism of the external/perceptual view concerns how the studies related to it were interpreted. Initially, when examining the experimental evidence described above, it appears to favour the external/perceptual view of presence, yet it also serves to support the conceptual model for several reasons.

First, each experiment indicates that media which requires internal/conceptual processing such as imagery instructions (Banos et al., 2005) and abstract content (Waterworth et al., 2001), whilst providing a lower level of experienced presence still elicits some form of presence, and this is presumably proportionate with individual imaginative capabilities. If the proposition is true that media requiring conceptual processing did not produce presence, but instead produced ‘absence’ because of the conceptual component involved, then the levels of reported presence should not be recorded as being lower than immersive media; it should be recorded as zero. By the definition proposed by Waterworth et al. (2001), one cannot read or engage in imaginative activities without entering the space that Waterworth and Waterworth (2001) designated as ‘absence’.

Pinchbeck and Stevens (2005) assert that “Simply stating that reported presence from media with low immersive capabilities is not presence but something fundamentally different, if indistinguishable when using existing measures, is an unacceptable stance” and that “To view presence as either a unitary, or a uniquely perceptual construct is untenable. Instead, it appears more likely that presence is an
emergent property of a combination of cognitive and perceptual processes and stimuli” (Pinchbeck & Stevens, 2005, p. 222).

Second, the argument that the more immersive form of media, the more it produces an intense presence experience does not mean that cognition has no part in the process. If, as Waterworth and Waterworth (2001) suggest, the incoming stimuli (regardless of the level of immersive quality) serve only as the raw material out of which a mental model is constructed (Biocca, 2003; Schubert & Crusius, 2002; Schubert, Friedman & Regenbrecht, 2001) then an initially more complete environment would be naturally easier to process cognitively, thus reducing conceptual tasks and providing a more intense presence experience.

Nuñez and Blake (2003a) report on experiments that shared several similarities in examining the potential relationship between presentation quality and the sense of presence. The experiment was conducted as part of a larger study into the cognitive processing of participants in virtual environments. A direct comparison of presence scores was collected from three separate groups of users each visiting the same virtual environment but on a different display system. The first group were on a high quality graphical system, the second on a low quality graphical system, and the third group on a text-based system. The purpose of the experiment was to investigate how text displays would compare to graphical displays with regard to presence elicited. The measurement of presence levels were by means of the Slater et al. (2003) presence scale, and the Presence Questionnaire of Witmer and Singer (2005). The results confirmed that graphics-based virtual environments produce statistically higher levels of presence than text-based systems, but the actual difference between both produced was quite small. The authors proposed that the difference can be regarded, for many practical applications, as negligible, and “the designer of text-based virtual environments can expect the presence on those systems to be lower than in graphics-based systems, but by less than 20%. Although lower presence implies a reduction in benefits such as task performance enhancement and effective navigation, the fact that the difference is small in turn implies that the reduction of these benefits will also be small” (Nuñez & Blake, 2003b, p. 3).

Quantitative methods for measuring the presence experience (such as the Presence Questionnaire) have been accepted and embraced within the presence research
community for a reasonable amount of time and many experiments have been carried out utilising them. Whilst using quantitative methods does aim for a sense of consistency, on the other hand, qualitative methods provide rich and detailed data that reflect the experiential and phenomenological aspects of the presence experience. However, qualitative methods are still underutilised in presence studies to date (2012).

It can be argued that the studies carried out by researchers such as Waterworth and Waterworth (2001) may not, in fact, measure the experience of presence itself, but rather, they measure the effects of presence. Thus, it provides feedback that may in fact illustrate that defining presence as ‘present’ and imagining as ‘absent’ are somewhat narrow conceptualisations and do not explore either definition with significant complexity. Presence in itself is an experience that has both tangible as well as intangible effects. Having these qualities, this phenomenon requires the understanding of not only the quantity of the experience, but also the quality of the experience. The use of Likert scales (which are commonly in presence research) to measure an experience may not be the best method to understand such a complex phenomenon as presence. On the one hand, the benefit of these types of scales is that questions used are usually easy to understand and so lead to consistent answers. Conversely, a disadvantage is that only a few options are offered, with which respondents may not fully agree; and issues can occur where people may become influenced by the way they have answered previous questions. Likert (1932) gives an example such as if a respondent has agreed several times in a row, they may continue to agree. They may also deliberately break the pattern, disagreeing with a statement with which they might otherwise have agreed. This patterning can be broken up by asking reversal questions, where the sense of the question is reversed – thus in the example above, a reversal might be ‘I do not like going to Chinese restaurants’. Sometimes the ‘do not’ is emphasised in order to ensure the respondent notices the difference in questions, although this can cause bias and hence caution should be applied when using it in surveys.

Another issue is that there is much debate about how many choices should be offered in a questionnaire. That is, confusion is observed in having an odd number of responses. Midpoint neutral statement of “neither agree nor disagree” is confused
with “don’t know” or “not available” (Raaijmakers, Van Hoof, Hart, Verbogt & Vollebergh, 2000). An odd number of choices allows participants to ‘sit on the fence’, whereas an even number forces people to make a choice, whether this reflects their true position or not.

The use of Likert scales is also argued to contravene one of the important principles of formulating an instrument: clarity and conciseness. That each Likert scale item measures more than one dimension at a time is considered to increase cognitive complexity, thus elevating measurement error (Hodge & Gillespie, 2003); each item of the scale measures both directions (agree/disagree) and strengths (strongly, or not so). This can also make the most extreme positions (strongly agree/disagree) under-reported (Albaum, 1997).

A related criticism of the external/perceptual model is the method of determining if a sense of presence has been achieved. Whilst there are several neurophysiological phenomena studies testing brain activity (EEG) and its relation to presence experienced (Schlögl, Neuper & Pfurtscheller, 2002), in terms of outward physical response, Waterworth and Waterworth (2001) adopt Nunez and Blake’s (2001) reference of ‘behavioural presence’ or the ‘postural or movement approach’ (Nunez & Blake, 2001, p. 115). This, they state, distinguishes presence from mere conscious attention: “The reader of a novel may become deeply engrossed in the lives of the characters and the action that is described, but they are unlikely to move their bodies unconsciously to avoid a hazard that is only described in text” (Waterworth & Waterworth, 2001, pp. 204-205). However, while there appears to be little disagreement within the presence community as to the prerequisite that a level of physical response is required whilst the individual is experiencing a sense of presence, within this debate, the extent to which this is the case is yet to be determined.

The next section offers a discussion of the internal/conceptual view of presence, the cognitive processes involved in producing a mental model to which the individual responds, the suspension of disbelief and facilitating mental simulation, providing an insight into the processes by which presence occurs in ‘low-immersive’ media.
3.6 Conceptual Presence

In discussion regarding presence and its various perspectives, it is important to note their emergence within the field of telerobotics engineering/’hard sciences’. Since its inception, presence research has developed substantially to recognise the capacity of other fields of research and other media forms to provoke the same essential experience, although the debate regarding ‘non-technological media’ eliciting a sense of presence still persists.

The mental model

According to Schubert, Friedmann and Regenbrecht (2001), presence is an experience which is derived from interaction with a mental model of the surrounding environment. This aligns with similar theories that have been applied to the process of reading such as Oatley (1999), who posits: “human mental life depends strongly on constructive abilities. What human minds do generally is to make models that parallel the workings of the world” (Oatley, 1999, p. 105). However, the most significant point in terms of presence is the individual’s interpretation of their mental model, for it is within this internal conceptual act that a sense of presence is felt (Schubert et al., 2001); what is most important about this is to recognise that the mental model does not only apply to technologically mediated involvement. In the *Five Theses* (Schubert & Crusius, 2002), when referring to the “cognitive representations as another theoretical layer”, they mean that all perceptual cues (whether originating in the physical, virtual or imaginary environments) serve to construct an internal representation that we react to; that is, they are all filtered through cognitive representations. A sense of presence may then result from a distal attribution of that internal model (Biocca, 2003).

Distal attribution is defined by Loomis (1992) as a phenomenon where “most of our perceptual experience, though originating with stimulation of our sense organs, is referred to external space beyond the limits of the sensory organs” (Loomis, 1992, p. 113). In relation to the theory of distal attribution is ‘embodied cognition’ (Beer, 1995; Clark, 1998; Greeno & Moore, 1993; Thelen & Smith, 1997; Wertsch, 1998) where the environment is regarded as a part of the cognitive system. Furthermore, “the forces that drive cognitive activity do not reside solely inside the head of the
individual, but instead are distributed across the individual and the situation as they interact” (Wilson, 2002). Simply put, the model that we construct from within becomes mapped onto, or attributed to, the external environment.

Schubert et al. (2001) argue that the experience of presence in text, film and virtual reality originate from the same cognitive process; when in the process of the presence experience, the mind both constructs objects and entities, as well as suppresses irrelevant information.

In particular, the authors of the MEC Model of Spatial Presence (Vorderer et al., 2003) stress the importance of the role of the mental model in the presence experience. As discussed previously, a spatial simulation model is formed based upon two primary components of information; the ‘top-down component, which relies upon the implementation of pre-existing knowledge to construct the mental model, and the ‘bottom-up’ component, which constructs the mental model based upon descriptive information.

The core elements of both the suppression/construction model and the top-down/bottom-up model both form the basis for the discussion in the following sections that describe how the mental model functions to form a sense of presence. Mental simulation, which has been described as an embodied, grounded, and situated cognitive activity, plays an essential role in bottom-up processing and is the functional act that produces the structure of the mental model. Biocca (2003) sees mental activities such as dreams, daydreams and hallucinations as evidence that the mind is able to produce “compelling spatial environments” (Biocca, 2003, p. 17) and Schubert et al. (2001) compare mental model construction to language comprehension and memory.

Related to mental simulation is ‘grounded’ or ‘embodied cognition’, which is where the human cognitive activity is grounded in sensory-motor processes and situated in specific contexts and situations. Therefore, in this view, concepts consist of the reactivation of the same neural pattern that is present when we perceive and/or interact with the objects they refer to. Both mental simulation and grounded/embodied cognition are two such concepts that may be instrumental in
constructing simulations of the present and future as called for by acts of imagination.

**Suspension of disbelief**

A concept that has been discussed at length in the literature on fiction, film and presence is the suspension of disbelief (Coleridge, 1847), an action that appears integral to the act of mental simulation. As the activity of engaging in narrative does require engagement and cognitive effort, willingness and motivation on the part of the reader (Gerrig, 1993; Gysbers et al., 2004; Ryan, 2001) that initial step towards receptivity to the narrative requires explanation.

Biocca (2003), in defining the experience of presence in the imaginal environment, describes it in terms that are rather similar to the concept of the suspension of disbelief, noting that diminished attention and responsiveness to sensory cues in the immediate environment (versus the virtual environment) is a prerequisite to presence. In a similar capacity, suppressing the surrounding physical environment is a task that is essential to involvement (Schubert, 2003; Schubert et al., 2001), memory, and language comprehension (Glenberg, 1997). Suppression is therefore accomplished through the suspension of disbelief on the part of the reader. Further to Glenberg’s (1997) example involving language comprehension, he points out that the suspension of disbelief (although not specifically referred to as such) is accomplished through the suppression of the physical environment and the structure of language itself. Therefore, in order to ‘run’ a mental simulation, the physical world must be suppressed, or ‘left behind’, and the physical symbols that signify the mediated world must ‘fall away’ to reveal the connotations they were crafted to produce.

However, according to the proponents of the external/perceptual view of presence, the suspension of disbelief alone is deemed insufficient to invoke telepresence:

> The root of the problem with many existing models of presence is perhaps confusion between presence and suspension of disbelief. Suspension of disbelief is the result of conceptual processing which then leads to a secondary sense of involvement – as when we read a gripping novel in which we become
engrossed. On the other hand, we see presence as that which arises in situations where no belief suspension is needed, because the display is immediately perceptually engaging.

(Waterworth & Waterworth, 2001, p. 204)

One potential problem with this perspective is that it neglects the notion that the suspension of disbelief is required for highly immersive virtual experiences. For example, it could be argued that the sensation of the weight of a head-mounted display must require the suspension of disbelief arising from the weight or pressure on the head in order to experience a sense of telepresence. Put another way, devices that are used to create a display can encroach on the senses in a way that does not correspond to the content of the display, serving as constant reminders of the mediated nature of the experience. In almost every technology intended to foster telepresence, there are numerous examples of this problem, and to date, there are very few ways in which to completely rid of certain devices that are created for the mediated telepresence experience.

In some contexts, such as text-based virtual environments, a functional transfer of knowledge between ‘real’ and ‘virtual’ about learning experiences can be reached by not providing all the details and information typical of a high fidelity reconstruction, but leaving users in a particular ‘suspended position’: they only receive a few details about the virtual context and starting from this incomplete level of information, they can ‘complete’ the lack of definition in virtual environments constructing the scenario. This is the model of construction detailed above (Schubert et al., 2001). In this process of knowledge construction, imagination plays a major role: “although detailed description is critical in fostering a sense of presence in imagined and imaginary worlds, novelists, literary theorists, and other scholars agree that details must be selective and that depth of detail should not undermine the “glory of imagined description” (Schubert et al., 2001, p. 655).

Several other researchers agree with this notion of construction, underlining the role of imagination in experiencing presence (Biocca & Levy, 1995; Ryan, 1991), with Reed (1991) stating that “readers want only a few external details to confine their imaginations; they will take what the writer has given and supply the rest” (Reed, 1991, p. 5) The imagination is seen as filling in the gaps of information facilitating
and reinforcing the involvement and engagement also in textual materials (Jacobson, 2001).

According to Schiano and White’s (1998) opinion, some individuals prefer text-based environments (not audio and video) in order to represent themselves, thus giving the individual a greater sense of agency; imagination is critical for the sense of presence. For this reason, Gerrig and Pillow (1998) change the definition of presence from ‘willing suspension of disbelief’ into ‘willing construction of disbelief’ where people believe and support what they read or experience.

Conversely, the notion of ‘anomalous response’, proposed by Gerrig (1993), does not rely on suspension of disbelief to explain mental simulation as it occurs in the experience of narratives. He suggests that there is something deeper than intentional ‘ignorance’ at work:

> I reject simple ‘toggle’ theories of fiction which have suggested that readers perform some mental act called ‘the willing suspension of disbelief’ that eviscerates the effects of fiction. Whatever the effects of narrative worlds may be, they will arise because of strategic actions that experiences do and do not perform with respect to those worlds. (Gerrig, 1993, p. 17)

Replacing the notion of the suspension of disbelief, Gerrig suggests that anomalous suspense explains how the narrative world comes to take precedence over the individual’s immediate surroundings. The phenomenon of anomalous suspense describes reader suspense under conditions in which their real-world knowledge should prevent the sensation of suspense.

In order to test this concept and demonstrate its salience, Gerrig set up two conditions in which experimental participants must read a story and respond to questions. In the first condition, the story is written in such a way as to inspire suspense in the reader while, in the other condition, the story is not written to inspire suspense. The results showed that, on average, participants in the suspense condition took significantly longer to determine the truth of factual outcomes (that they had knowledge of beforehand) than participants in the non-suspense condition (Gerrig, 1993). Gerrig attributes this finding to the reader’s tendency to consider the potential
conclusions insinuated by the text. In other words, when a set of hypothetical circumstances or conditions are presented that provide a congruent internal framework, alternative scenarios are entertained in spite of real-world awareness. Gerrig further argues that this occurs because of an “expectation of uniqueness” (Gerrig, 1993, p. 170) that we experience while progressing through the event structure of a narrative. Such an expectation, he suggests, derives from an “optimization of cognitive resources” (Gerrig, 1993, p. 170) that evolved from our interactions with physical reality, which never quite repeats itself the way our own manufactured narratives do.

M.T. Jones (2008, 2009) argues that is a reasonable conclusion considering that throughout the majority of our development as a species the precise repetition of an event (or even a story that is told orally) has rarely, if ever, been encountered. With the invention of recorded narrative, details are held standard even although on some primitive level, we never expect to encounter the identical set of details when revisiting the same narrative despite the fact that, logically, we should. In this sense, mental simulation should be viewed as an active process which does not run a standard program of simulation the way, for instance, a sound file played in a stereo might simulate the sound of an orchestra; it is an active process of creation and recreation that takes on its character at the moment of inception.

Similar to this notion of improvised creativity are children’s imaginative games. Harris, Brown, Marriott, Whittal, and Harmer (1991) tested the notion of creativity in an experiment: using two empty boxes, they asked children to pretend that a particular box contained either a monster or a rabbit. The findings showed that children interacted with that box differently (approaching and touching it), once the experimenter had left, even though the children had verified and acknowledged that the suspect box was empty. Gerrig (1993) interprets this in terms of his anomalous suspense theory: “When subjects become immersed in a narrative world in which the box is occupied, they might find that because attention is so thoroughly captured, knowledge of the box’s real world emptiness is momentarily crowded out of consciousness” (Gerrig, 1993, p. 194).
Facilitating mental simulation

Biocca (2003) reminds us that Munsterberg, the first psychologist to study media in 1916, hinted at an issue which has not always been not taken into account when examining presence and its effects: media obey laws of the mind. Presence is a user experience and it is not intrinsically bound to any specific type of technology, but is rather a product of the mind (IJsselsteijn & Riva, 2003). Biocca (2003) also reminds us of the celebrated phrase of Bricken, from the 1990 SIGGRAPH (Special Interest Group on GRAPHics and Interactive Techniques) conference: “Psychology is the physics of virtual reality”. According to Biocca, this sentence implies that, like physics, psychology holds a key to our understanding of reality. Therefore, VR “has less to do with simulating physical reality per se; rather it simulates how the mind ‘perceives’ physical reality” (Biocca, 2003, p. 18).

In moving the focus from user characteristics to media/medium characteristics, it is important to discuss some features of low-immersion media (such as text) that may be manipulated to ease the process of mental simulation; this in turn creates a stronger mental model that is more capable of inducing presence. Media requiring much mental imagery and conceptual processing often use strategies to transcend the medium; Joseph Conrad reinforces this through his often cited quote: “My task which I am trying to achieve is, by the power of the written word, to make you hear, to make you feel – it is, before all, to make you see” (Conrad, 1951, p. 26).

Coleridge (1847), in his Biographia Literaria, in the context of the creation and reading of poetry, also attempted to achieve the same goal through the ‘suspension of disbelief’. Poetry and fiction involving the supernatural had lost its popularity to a large extent in the eighteenth century, in part due to the declining belief in witches and other supernatural agents among the educated classes who embraced the rational approach to the world offered by the new science. Coleridge’s concept of ‘willing suspension of disbelief’ explained how a modern, enlightened audience might continue to enjoy such types of story, with the author recalling:

It was agreed, that my endeavors should be directed to persons and characters supernatural, or at least romantic, yet so as to transfer from our inward nature a human interest and a
semblance of truth sufficient to procure for these shadows of imagination that willing suspension of disbelief for the moment, which constitutes poetic faith. Mr. Wordsworth on the other hand was to propose to himself as his object, to give the charm of novelty to things of every day, and to excite a feeling analogous to the supernatural, by awakening the mind’s attention from the lethargy of custom, and directing it to the loveliness and the wonders of the world before us. (Coleridge, 1847, Chapter 24)

Both examples reveal the author’s intention to use language in such a way as to access the perceptual senses of the reader through the written word.

Birkerts (1994) and Ryan (2001) believe that the connotative and denotative capacity of words and symbol allow abstract codes to be processed in such a way as to draw attention to what they signify rather than their own particular characteristics as signifiers. Birkerts goes further to explain that “reading is a conversation, a turning of codes into contents” (Birkerts, 1994, p. 97) and more emphatically, Glenberg (1997) notes that “we understand language by creating embodied conceptualisations of situations the language is describing” (Glenberg, 1997, p. 12). Responsible for the experience of presence is the formation of these embodied conceptualisations which are at the heart of the process.

3.7 Discussion and conclusion

Although research on presence has gained new momentum and direction within the past five years, researchers are recognising that cognitive theories of spatial presence are needed, and rather than focussing on the question what is presence, it is now how does presence occur that has become the focus. Therefore, rather than emphasising aspects of the measurement of presence, attempting to create theories about the process of the presence experience offers a significant contribution to the field. However, while the current debate is on the cognitive and experiential aspects of presence, to date there still remains a significant absence of discussion linking the cognitive aspects of other disciplines such as imagining in the design process.
Presence research and its connection with agency provide enormous possibilities for the exploration of environments allowing different opportunities supporting users and their intentions. However, within this, there are still opportunities to scrutinise different forms of presence, encompassing perception, neurological processing, cognition, interaction and emotions, affecting people and culture, especially in the disciplines of architecture and interior design, as well as in the process of designing. This raises an important question: how can these various characteristics of presence allow the design and development of essential elements that capture the salient aspects of human presence and interaction within spatial design?

The two separate conceptualisations of presence – the external/perceptual view and the internal/conceptual view of presence – are essentially opposing views yet both raise valid arguments perhaps suggesting that presence should not be viewed as only external/perceptual or internal/conceptual. ‘The book problem’ (Biocca, 2002, 2003; Schubert & Crusius, 2002), where the possibility of experiencing presence in a seemingly very low immersion form of media is a strong foundation for the proposition that an individual may experience presence in a situation of imagining during the design process.

Where the original ‘two pole model’ of presence considered virtual and physical spaces, but not imaginary spaces, Biocca’s (2003) ‘three pole model’ allows for the role of mental imagery space. However, where this model takes the conceptualisation of presence to another level, to date, there is still room for further studies which include imagined spaces that architects and designers utilise in their practice of designing on a daily basis, either to solve problems, to ‘understand the space’ (cognitively), or to ‘experience’ other non-tangible possibilities the space may contain. In proposing the three pole model, the ‘mental imagery space’ can be accounted for; it allows spatial cues which contribute to the mental model, thus in turn, facilitating presence.

Setting up a logical criterion for discriminating between the experience of presence and ‘absence’, the external /perceptual view of presence endorsed by Waterworth and Waterworth (2003, 2003b) and others leads to an understanding of the factors and contexts that enhance and detract from the experience of presence. On the other hand, this view also contains a number of implicit assumptions that efficiently steer
clear of the more complex examination of cognition. Although the external/perceptual view ‘fits’ more neatly with the disciplines such as engineering, which depend on more quantifiable phenomena, it does not necessarily ‘fit’ as well with disciplines such as the humanities, and architecture and design, which are more open to qualitative based phenomenon.

The term ‘absence’ used in the external/perceptual view depicts non-presence in conceptual processing; describing this conceptual space as ‘absence’ makes a greater case for the distinction between ‘external’ and ‘internal’ perspectives, as well as the risk that the deeper underlying phenomenon may be overlooked for the sake of simplicity. If phenomena such as reading, daydreaming or dreaming are considered to be absence, based upon their conceptual nature, it would seem that an understanding of presence as a subjective psychological state is no longer salient as it is now determined based on subjective location of the body, regardless of where the mind is focused.

The experience of reading, daydreaming or dreaming poses several complex questions. What occurs when an individual feels as though they are both ‘there’ as well as ‘here’? Is one partially absent, or partially present? The laws of physics state that if a physical entity is real, if they are absent, then equally they are present somewhere. If someone is observed to be deep in thought, or ‘absent’, from reality, it does not necessarily mean that the experience of the person being observed is that of being absent from the locale of their mind. If, as the above example illustrates, one considers oneself both ‘there’ as well as ‘here’, is one neither absent or present, or are they both absent and present?

In terms of the methodologies used in past presence research studies, it is generally understood that the focus is on the measurement of the effects of presence, rather than the experience of presence. Presence in itself is a phenomenon that is felt through the physical body as well as the mind, and focussing on one aspect over another may not provide an authentic’ understanding of the overall experience. Having these qualities, this phenomenon requires the understanding of not only the quantity of the experience, but also the quality of the experience.
Whilst the current focus of presence research is on the cognitive and experiential aspects of presence, there still remains a significant need for discussion linking cognitive activities of the design process with research such as presence, specifically, non-technology mediated presence. The research outlined in this thesis responds to this need. The review of presence has revealed opportunities for a deeper exploration of imagining and the design process.
CHAPTER 4: METHODOLOGY

4.1 Introduction
As indicated previously, this thesis project was prompted by the desire to better understand how designers design, and to explore the implications of this for education in the spatial design disciplines such as architecture and interior design. Of particular interest was the role of imagining in the synthesis stage of the design process. This chapter provides a description of the methodological approach and processes undertaken in exploring the phenomenon of imagining. It commences with an overview of Grounded Theory as the methodological framework underpinning and guiding the study. It explains its role in defining and refining the research question and objectives and how it informed the development and implementation of the research plan. The research plan and its implementation are discussed then in detail with specific attention given to participant selection, data collection and analysis. Issues of research quality and rigour are also addressed.

4.2 Grounded Theory as a Methodological Framework
Unlike many research projects that begin with a specific question or hypothesis, this study began with some very broad questions and assumptions. As already highlighted, the questions concerned the nature of imagining, how it is experienced and understood by designers, and how the knowledge on presence generated outside the spatial design areas might inform a richer theoretical understanding of designing. In this respect, the project commenced with three main assumptions: that knowledge to do with imagining could be extended through empirical research involving designers, that this could be further informed by extant theory on presence, and that the resulting expanded theory on imagining would be relevant for design education and practice. At the heart of this was the problem of not knowing what happens in the designer’s head in the early stages of design when ideas and proposals are generated. As a design educator, early questions grappled with included: What was it that the students were experiencing? What was going on in the students’ mind during the activity of designing? Why was there an apparent ‘disconnect’ with the surrounding environment during this process? Furthermore, what can be articulated
about this process? What can be learnt about this mental process? How is it possible to teach students about a process that is so difficult to articulate?

Not wishing to be too selective or prescriptive at the outset, Grounded Theory was selected as the underpinning and informing methodology, as “Grounded Theory does not spontaneously arise; rather it is generated, developed and integrated by the researcher through the application of the essential Grounded Theory methods” (Birks & Mills, 2011, p. 20).

Before providing an historical overview of Grounded Theory and explication of its significance for the study, the following section establishes the philosophical position of the study in relation to the broader context of qualitative research.

**Philosophical context**

There are various paradigms in social sciences research which are hotly debated, depending on the context of the research and the position of the researcher. Amaratunga, Baldrey and Sarshar (2001) assert that, especially in the areas of science and methodology, theorists continue to raise debate about how best to conduct research. For the purposes of background contextualisation, this research positions itself in relation to two fundamentally different and competing schools of thought or inquiry paradigms: logical positivism, “which uses quantitative and experimental methods to test hypothetical-deductive generalisations” (Patton, 1990, p.37), and interpretive inquiry, which uses qualitative and naturalistic approaches to inductively and holistically understand human experience in context-specific settings. Where the former approach demands a need for independence of the observer from the subject being observed; the latter aims to understand and explain a phenomenon rather than search for external causes or fundamental laws (Easterby-Smith, 1991; Remenyi, Williams, Money & Swartz, 1998).

Although essentially disparate, these two primary research paradigms are employed in social research (Cohen, Manion & Morrison, 2000; Shaughnessy & Zechmeister, 1997) and have their own assumptions, beliefs and values about the nature of knowledge and reality. They set out to achieve different goals through their methodologies. Explained simply, the positivist research paradigm believes that there is one external reality which represents the only truth for any phenomenon
investigated. Owens (1982) states that in the positivist paradigm, “certain parts of the real world, which are called ‘variables’ may be singled out from reality for study or treatment while controlling other parts of the setting” (Owens, 1982, p. 4 in Kember Lai, Murphy, Sian, Wong & Tuen, 1990). Hence, the positivist research paradigm aims to establish causal relationships between data collected, based on factual or statistical evidence and is concerned with objectivity, prediction and generalisation of events (Cohen et al., 2000; Shaughnessy & Zechmeister, 1997). It is deductive and theory testing and uses quantitative methods of data collection such as surveys and experiments which are statistically ‘friendly’.

Conversely, the interpretive research paradigm differs from the positive approach in that its essential belief is that there are multiple realities regarding an investigated phenomenon. Owens (1982) states that in the interpretive paradigm, “in the real world, events and phenomena cannot be teased out from the context in which they are inextricably embedded, and understanding involves the interrelationships among all of the many parts of the whole” (Owens, 1982, p. 6 cited in Kember et al., 1990). Therefore, the interpretive research paradigm is concerned with the human understanding of events and their behaviours within a given context (Cohen et al., 2000; Shaughnessy & Zechmeister, 1997). It is usually inductive and theory generating. The interpretive research paradigm normally uses qualitative methods of data collection such as open ended or semi structured interviews, diaries or other documents and observations that are useful in exploring the uniqueness of a given situation.

Qualitative research is grounded in a constructivist philosophical position in the sense that the approach is concerned with how the complexities of the socio-cultural world are experienced, interpreted and understood at a particular point in time (Mills, Bonner & Francis, 2006a). It was contended that for this study, purely quantitative methods were unlikely to draw out the rich data necessary to address the proposed research purposes. Conversely, in the researcher’s view, the fundamental assumptions and key features of qualitative research fit well with this study. These features include understanding the processes by which events and actions take place; developing an understanding of the context; facilitating interactivity between the
researcher and the participants; adopting an interpretive stance; and finally maintaining flexibility in the design of the study.

Table 4.1 provides a philosophical summary of the research presented in this thesis. As it indicates, philosophically the research is positioned within an interpretivist paradigm reflecting social constructivist ontology. The research strategy overall, is abductive. The context for the study has two dimensions: an empirical context involving the early stage of designing as experienced by design practitioners from the spatial design disciplines of interior design and architecture; and a theoretical context established by research on presence as well as existing design methodology research. The main phenomenon of the study is imagining explored using a Grounded Theory framework accommodating questionnaires and semi-structured interviews as the primary data collections methods, and open, axial and selective coding methods for analysis of the data collected. These methods will be described in detail following an historical overview of Grounded Theory.

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<td>Analytical method</td>
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Table 4.1: Philosophical summary of the research
**Historical overview of Grounded Theory**

Grounded Theory is an interpretative research methodology developed in the late 1960s to serve as a data-based tool to generate theory from data. According to Goulding (1999), the roots of Grounded Theory can be traced back to the symbolic interactionism the origins of which lie in the work of two American behavioural sociologists, Cooley (1864-1929) and Mead (1863-1931) who wanted to avoid the polarities of psychologism and sociologism. Psychologism is a generic type of position in philosophy according to which psychology plays a central role in grounding or explaining some other, non-psychological type of fact or law; put simply, the basic thesis is that the ‘laws’ of logic are only empirical generalisations based on observation of the workings of the human mind. Sociologism is the theoretical position that asserts that knowledge is socially constituted and that leads to the study of the social texture of knowledge.

Symbolic interactionism arose from Mead’s view of ‘self’, ‘I’ and ‘me’ that are found in an individual, where an individual’s ‘self’ determines the behaviour displayed in reaction to an object, a person or an event within a social context. Symbolic interactionism is a term that basically describes the most human and humanising activity that people can engage in – talking to each other. The three core principles of this theory are meaning, language, and thought: meaning is the construction of social reality, language is the source of meaning, and thought is the process of taking the role of another.

Thus, Mead (1964) believed that human beings are products of our society, moulded through social experiences, interactions and interpretations. In short, symbolic interactionism works on the basis that human beings interpret their various conditions posed by their environment and act upon them with the information of their interpretations (Morrison, 2002). Through their interpretations, they assign meanings to the actions of others and their own actions as influenced by social conditions or interactions around them (Dimmock & O’Donoghue, 1997). These assigned meanings are then processed and adjusted accordingly through one’s own internal interpretative mechanisms that result in his/her interaction/action in response to the relevant phenomenon (Dimmock & O’Donoghue, 1997; Mead, 1964; Morrison, 2002).
Cooley coined the term “looking glass self” from the “me” aspect of Mead’s basic principles, meaning that a person’s self identity grows out of their relationship with other people. Blumer (1969) proposed a similar view by suggesting that by following rules we have to put ourselves in the position of others.

According to this paradigm, individuals engage in a world which requires reflexive interaction as averse to an environmental response. They are purposive in their actions and will act and react to environmental cues, objects and other individuals according to the meaning these hold for them (Goulding, 1999, p. 5).

From this paradigm, methodologically, the researcher is required to enter the worlds of those being studied in order to observe the actor’s environment and the interactions and interpretations that occur (Schwandt, 1994). Using the principles of these authors and others, including Goffman (1959, 1961, 1970) as a foundation, Glaser and Strauss (1967) aimed to develop a more defined and systematic procedure for collecting and analysing qualitative data, arguing for a rationale of theory that was grounded-generated and developed recursively through interplay with data. This was seen as revolutionary as it challenged the paradigms of the quantitative model that was dominant in the social sciences, both in terms of its ‘artificial’ divisions between theory and research, and in the inferior role assigned to qualitative research (Charmaz, 2000, p. 511). Based on Mead’s principles, symbolic interactionism was set in place as a philosophical theory and was further extended into a set of research methodological assumptions by Blumer (1969), who proposed three premises of symbolic interactionism in the operation of its corresponding research methodology. Firstly, individuals act towards things on the basis of the meanings that the things have for them; secondly, the meaning of such things is derived from, or arises out of, the social interaction that an individual has with their fellow individuals; and finally, these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he/she encounters.

With its symbolic interactionist foundation, Grounded Theory first originated from Barney Glaser and Anselm Strauss, both sociologists, who used it in their qualitative studies of the phenomenon of dying in hospitals (Charmaz, 2006). They developed systematic Grounded Theory methodological strategies in their original and seminal
text *The Discovery of Grounded Theory* which was published in 1967. They saw this new methodology as an opportunity to “close the embarrassing gap between theory and empirical research” by pointing at “improving social scientists’ capacities for generating theory that will be relevant to their research” (Glaser & Strauss, 1967, p. 7). Furthermore, Grounded Theory was seen as “developing canons more suited to the discovery of theory” instead of the quantitative verification tools of “sampling, coding, reliability, validity, indicators, frequency distributions, conceptual formulations, construction of hypotheses, and presentation of evidence” (Glaser & Strauss, 1967, pp. 7-8).

Whilst Grounded Theory has roots in sociology and symbolic interactionism, as previously explained, the Glaser and Strauss approach to methodology was seen as a necessary alternative to the grand theory approaches within sociology and this was their attempt to close this gap between theory and empirics by introducing a different theory concept and by formulating principles of comparative analysis. This was to seek an understanding about behavioural patterns that shape social process as people interact together in groups (Glaser, 1978). The emphasis behind Grounded Theory was generation of ‘new’ theory, where the theory evolves during the research process and is an ongoing process and interplay between data collection and analysis of the data. This method is different from other qualitative methods in that the researcher does not wait until all the data are collected before analysis begins, but rather through sorting and memoing, the search for meaning through the examination of data commences in the early stages of data collection (Charmaz, 1983, 1994, 1999; Glaser 1978, 1992, 1994, 1995; Glaser & Strauss, 1967; Stern, 1980, 1994; Strauss, 1991; Strauss & Corbin, 1990, 1994, 1997). It is “usually used to generate theory in areas where little is already known, or to provide a fresh slant on existing knowledge about a particular social phenomenon” (Goulding, 1999, p. 6). In terms of existing theory, Glaser (1978) discusses how it is significant in sensitising the researcher to the conceptual significance of emerging concepts and categories. In this respect, knowledge and theory are inextricably interlinked and should be used as if they were other informants. In another words, existing theory should not be overlooked as it provides the necessary links to concepts being researched.
Following the publication of *The Discovery of Grounded Theory*, Glaser and Strauss worked separately, with Glaser developing and focusing on the more theoretical side of Grounded Theory. The outcome was *Theoretical Sensitivity* published in 1978 which provided more about the origins of Grounded Theory, strategies for qualitative research as well as more specific and practical advice to individuals undertaking Grounded Theory methodology. It was nine years later that Strauss developed the more pragmatic, or ‘hands-on’ approach in his 1987 book *Qualitative Analysis for Social Scientists*. Where Glaser had developed the theoretical side to Grounded Theory, this work took a much more in-depth systematic and detailed presentation of techniques qualitative researchers use in analysing data.

Their working separately finally resulted in a bifurcation in the Grounded Theory approach compounded by the publication of Strauss and Corbin’s *Basics of Qualitative Research: Grounded Theory, Procedures and Techniques* in 1990. The book provoked a highly critical public response from Glaser (1992), accusing the authors of a distortion and infidelity to the original objectives of Grounded Theory. It marked the emergence of an important schism in Grounded Theory, resulting in the ‘Straussian’ – inductive deductive approach, and the ‘Glaserian’ – inductive theory formation model (Stern, 1994).

With its humble beginnings in sociological research, Grounded Theory research methodology has become popularly applicable in many other areas of research such as education, psychology, business, information technology, medical science/health and cultural studies into the twenty-first century (Clarke, 2005). As Grounded Theory became more widely used, further variances in its methodological assumptions and methods arose. There are many different variations of Grounded Theory methodology four decades after its original conception (Mills et al., 2006). At the time that this research commenced, there were three main groups of Grounded Theory methodology, each of which stem from the core theorists in the area: The Glaserian approach (Glaser, 1992, 1998); the Strauss and Corbin approach (Strauss & Corbin, 1990, 1998); and finally, the Constructivist approach (Charmaz, 1990, 1994, 1995, 2000, 2006; McCann & Clark, 2003a, 2003b; Nelson & Poulin, 1997; Norton, 1999; Stratton, 1997) and Annells (1996, 1997a, 1997b, 1997c).
To summarise each approach, the Glaserian school of thought essentially takes a more social scientific approach with an emphasis on a unified ‘coding paradigm’ developed by the researcher and applied systematically to the study of causal relationships. Additionally, the Glaserian school embraces paradigm development using all data, including survey data and other quantitative data, not only qualitative data such as interviews. Conversely, the Strauss and Corbin school of thought differs from the Glaserian approach in that the Straussian school emphasises induction from qualitative field data, inferring variable labels (‘codes’) from statements of and artefacts associated with subjects being studied, allowing for multiple and possibly conflicting ‘coding families’. The Constructivist approach is a combination of Glaser’s methodology and the Strauss and Corbin approach. It essentially celebrates firsthand knowledge of empirical worlds, taking the middle ground between postmodernism and positivism. It assumes the relativism of multiple social realities and, in essence, holds the view that meaning is created, not discovered. Researchers are not neutral observers, but rather see situations as they really are, and as such, makes the researcher co-creators of meaning, acknowledging the creation of knowledge from personal experience.

This study was informed by several approaches including that proposed by Charmaz (1990, 2000, 2006), Annells (1996,1997a, 1997b, 1997c), and Corbin and Strauss (2008), who – unlike the Glaser (1967) and Glaser and Strauss (1998) approach – make the assumption that neither data nor theories are discovered. Charmaz’s premise is that “we are part of the world we study and the data we collect. We construct our grounded theories through our past and present involvements and interactions with people, perspectives, and research practices” (Charmaz 2006, p. 19). Therefore, rather than the theoretical rendering offering an exact picture of a studied world, Charmaz’s approach unambiguously assumes that it offers an interpretive portrayal of it. The implicit meanings and experiential views that emerge from the researcher’s completed Grounded Theory are constructions of reality. This approach allows for flexibility for the researcher as well as considering that research is “a craft that researchers practice. Like any craft, practitioners vary in their emphasis on one or another aspect but taken together share commonalities” (Charmaz 2006, p. 20).
Mills, Bonner and Francis (2006) stress that in order to ensure that a research design is strong, “researchers must choose a research paradigm that is congruent with their beliefs about the nature of reality. Consciously subjecting such beliefs to an ontological interrogation in the first instance will illuminate the epistemological and methodological possibilities that are available” (Mills, Bonner & Francis, 2006, p. 1). They assert that individuals are “all influenced by aspects such as history and culture, which in turn, shape our view of the world, the forces of creation, and the meaning of truth; therefore, as individuals, it is not easy to reach a conclusion or resolution about our personal view of truth and reality” (Mills, Bonner & Francis, 2006, p. 2). These assumptions are deep within our subconscious and are implicitly understood. Constructivism is a research paradigm that denies a knowable objective reality, “asserting instead that realities are social constructions of the mind, and that there exist as many such constructions as there are individuals (although clearly many constructions will be shared)” (Guba & Lincoln, 1989, p. 43 quoted in Mills, Bonner & Francis, 2006, p. 1).

Those who adopt this Constructivist understanding of the world assume a relativist ontological position (Guba & Lincoln, 1994). Relativists claim that concepts such as rationality, truth, reality, right, good, or norms must be understood “…as relative to a specific conceptual scheme, theoretical framework, paradigm, form of life, society, or culture…there is a non-reducible plurality of such conceptual schemes” (Bernstein, 1983, p. 8). In other words, the world consists of multiple individual realities influenced by context. Put simply, “relativist ontology questions the ‘out-there-ness’ of the world and it emphasises the diversity of interpretations that can be applied to it” (Willig, 2001, p. 13).

Constructivism, according to Hayes and Oppenheim (1997) and Pidgeon and Henwood (1997), places an emphasis on the subjective interrelationship between the researcher and participant, and the co-construction of meaning. Researchers are inherently part of the research undertaking, rather than standing aloof from the research as objective observers (Mills, Bonner & Francis, 2006). Therefore, their values must be acknowledged by themselves and by their readers as an inevitable part of the outcome (Appleton, 1997; de Laine, 1997; Guba & Lincoln, 1989; Stratton, 1997). Constructivist Grounded Theory, which is ontologically relativist
and epistemologically subjectivist, reshapes the interaction between researcher and participants in the research process and in doing so brings to the fore the notion of the researcher as author.

A former student of Glaser and Strauss, Charmaz (2000) emerged as the leading proponent of constructivist Grounded Theory. This perspective has been utilised as a methodology across many disciplines including education (Jones, S., 2002; Jones & Hill, 2003), nursing (Annells, 1997c; McCann & Clark, 2003a; Norton, 1999) and psychology (Corbet-Owen & Kruger, 2001; Dodson & Dickert, 2004; Madill, Jordan & Shirley, 2000); all of whom reference back to Charmaz (1995b, 2000) to formulate their argument for a constructivist approach to their own studies.

Charmaz, who asserts that a constructivist approach is both possible and is considered desirable by many using a Grounded Theory methodology, argues: “Data do not provide a window on reality. Rather, the ‘discovered’ reality arises from the interactive process and its temporal, cultural, and structural contexts” (Charmaz, 2000, p. 524). Charmaz (1995b) uses Grounded Theory to elicit multiple meanings by focusing on the data and the possibilities for meaning that can be constructed from them. Following the Charmaz approach, researchers need to search for meanings beyond the surface in seeking meaning in the data, searching for and questioning implicit or implied meanings about values, beliefs and ideologies. There is an underlying assumption that the interaction between the researcher and participants “produces the data, and therefore the meanings that the researcher observes and defines” (Charmaz, 1995b, p. 35). To enrich the data, Charmaz (1995b) positions the researcher as a ‘co-producer’ and encourages “a description of the situation, the interaction, the person’s affect and [their] perception of how the interview went” (Charmaz, 1995b, p. 33). The primary theme in Charmaz’s approach is the treatment of the data and their analytical outcomes. The researcher should immerse themself in the data in a way that embeds the narrative of the participants in the final research outcome and this immersion is played out through the use of coding language that is active in its intent and that “helps to keep that life in the foreground” (Charmaz, 1995b, p. 526). Raw data should be included in the researcher’s theoretical memos, continuing with this strategy as memos become
more complex. This ensures that the participant’s voice and meaning is present in the theoretical outcome (Charmaz 1995b).

The constructivist approach advocates a writing style that is more literary than scientific in intent; writing as a strategy. Charmaz argues that constructivist grounded theorists are encouraged to be analytical in their writing but that their style of writing needs to be evocative of the experiences of the participants (Charmaz, 2006). In short, the researcher’s voice should not “transcend experience but re-envision it…bring[ing] fragments of fieldwork time, context and mood together in a colloquy of the author’s several selves – reflecting, witnessing, wondering, accepting – all at once” (Charmaz & Mitchell, 1996, p. 299). This can be rather difficult but enables participants’ accounts to retain a degree of visibility in the text so that the reader can make the connections between analytical findings and the data from which they were derived (Fossey, Harvey, McDermott & Davidson, 2002; Jones, S., 2002). It also demonstrates the value the researcher places on the participant as a contributor to the reconstruction of the final Grounded Theory model and meets the researcher’s ethical obligation to “describe the experiences of others in the most faithful way possible” (Munhall, 2001, p. 540).

Traditionally, Grounded Theory researchers have maintained a position of ‘distant expert’ (Charmaz, 2000, p. 513). Revealing the researcher as the author of a co-construction of experience and meaning is an important development in Grounded Theory research. Essentially, in using Charmaz’s constructivist Grounded Theory approach, there is assistance in making meaning from the data, rendering participants’ experiences into readable theoretical interpretations and creating a sense of their presence in the final outcomes.

**Grounded Theory as a methodological framework for this study**

As previously stated, the impetus for this thesis project began in the interior design education studio; with a desire to better understand how I could more effectively support my students in learning how to design. Increasingly I became interested to know what was going on in the head of my students as they were developing their design proposals; my belief being that if I were privy to this I would better understand how and when to intervene rather than waiting until considerable time
and effort had been expended. After an initial exploration of design theory and design education theory, I quickly realised that there was very little knowledge about what happens between when the problem is identified or presented, and when something is externalised as a proposal or ‘solution’. While remaining mysterious and not explored to any great extent, there was however wide acceptance for the role of imagining and mental imagery in designing. For example, Zeisel (1981) refers to designing as involving imaging, presenting, testing; and while design education places significant emphasis on the development of presentation and representation skills there is little discussion about imagining, what this involves and how it can be developed (Singh 1999). As highlighted in Chapter 2, others were also increasingly dissatisfied with existing design methodology theory, particularly given the challenges facing the design community in responding effectively to increasingly complex social and environmental needs. Forming a richer understanding of imagining and imaging would, it appears, benefit not only me in my everyday role as a design educator, but potentially also a much wider audience.

Initial research aimed at finding an appropriate methodology for the study revealed how Grounded Theory is particularly useful for exploring an issue faced by a specific community or group (Glaser, 1992), particularly a qualitative issue situated as an integrated problem requiring an explorative, abductive-inductive approach for the generation of new insights, as opposed to a more conventional deductive approach. From a more qualitative, interpretive position, the issue faced by a community or group can be understood through comprehending their thinking processes, feeling their emotions and thus understanding the reasons behind their actions, reactions, and interactions (Charmaz, 2006; Glaser, 1978; Glaser & Strauss, 1967; Strauss & Corbin, 1998). In terms of methodology, Grounded Theory research is about the conceptualisation of data associated with a phenomenon experienced within a specific group and eventually results in the emergence of a theory or theories from the data itself (Glaser, 1992; Glaser & Strauss, 1967; Strauss & Corbin 1998).

Theory developed from Grounded Theory can be either substantive or formal. A substantive theory explains how specific subjects manage their experiences, dealing with a particular limited domain of inquiry, such as the experience of learning in
senior high school programs, palliative care, or the university first year experience for engineering students. Therefore, a substantive theory is close to a ‘real-world’ situation. Grounded Theory can further advance theoretical research by creating formal theories (Grbich, 1999; Strauss & Corbin 1998). By conducting similar studies in different contexts, it is possible to change a set of substantive theories into a formal theory. A formal theory, which makes up a number of substantive theories, attempts to provide a framework to explain the experiences of a number of social groups (Strauss & Corbin, 1998). A formal theory, in contrast to a substantive theory, deals with the more generalised domain, such as ‘socialisation’, and is necessarily more general and conceptually abstract. Given that this is the first study of its kind, the intention is to create a substantive theory and establish a basis for further research and the creation of a formal theory. In this respect, then, Grounded Theory appeared relevant to the research problem. Regarding the selection of any research methodology in a study, Field and Morse (1985) highlight the importance of its methodological relevance to the research problem and alignment with the researcher’s epistemology and ontology, which, in this case, sits very comfortably within the interpretivist paradigm.

As previously outlined, Grounded Theory is consistent with interpretive studies: “ours is interpretive work and interpretations must include the perspectives and voices of the people whom we study. Interpretations are sought for understanding the actions of individual or collective actors being studied” (Strauss & Corbin, 1994, p. 274). Despite its interpretivist and constructivist underpinnings, Grounded Theory has well-established rigorous guidelines for conducting data collection and analysis (Goulding, 2002), giving the researcher a sense of ‘security’ whilst exploring relatively ‘loose’ non-tangible and subjective phenomena. Finally, while Grounded Theory is not widely used within the design disciplines; it is a widely used and recognised research method in many other disciplines including the social sciences, nursing and healthcare, medical sociology, information systems, psychology and anthropology (Bryant & Charmaz, 2007).

**Qualitative methods in presence research**

Over the past decade, qualitative and mixed methods have gained popularity in understanding presence. ‘Place’ probes (O’Neill, McCall, Smyth & Benyon, 2004)
are qualitative tools designed to study sense of place incorporating a range of stimuli and techniques aimed at articulating an individual’s sense of place. Adopting a conceptual framework based on the concept of embodied interaction, the application of the place probe is within both a physical place and a virtual representation of that place and the comparison of the individual’s experiences. In light of the results, the place probes tool was refined to incorporate both qualitative and quantitative data on the experience of place. The results were analysed using a Glaserian ‘semi’ Grounded Theory approach. These authors’ argument for using a ‘semi’ Grounded Theory approach was that they already had “some theory of place that is underlying the analysis (O’Neill et al., 2004, p. 7). The data gathered for the place probes study, such as written descriptions, verbal reports, and sketch maps were analysed using a variety of mixed methods including Grounded Theory (Glaser, 1998), peer reviewing and semiotic analysis (O’Neill & Benyon, 2003) and various other forms of coding. Conversely, the questionnaires for the study provided a quantitative measurement tool used as a comparative tool to understand the immersiveness and effectiveness of virtual environments.

Turner et al. (2003) and Turner and Turner (2003) have undertaken qualitative research in the form of talk-aloud methodology, which is where participants provide a running commentary of their experience while they ‘explore’ a virtual environment. The authors then analysed the phenomenological data using quantitative methods. These authors also used a combination data collection approach involving questionnaires, structured interviews and talk-aloud methods. The data provided the opportunity to investigate how a sense of place that is created in a virtual environment can be benchmarked against the real world where the participant gives a retrospective written description of a familiar place which is then subjected to qualitative content analysis.

Some recent research has utilised certain presence questionnaires that have used a mixture of qualitative (content analysis and thematic analysis) and quantitative (physiological responses) methods (Garau, Ritter-Widenfeld, Antley, Friedman, Brogni & Slater, 2008). This research measured the temporal and spatial variations in presence through a qualitative analysis of interviews designed to investigate breaks in presence (BIP) within a highly immersive Virtual Cave environment. This
research differed from other ‘typical’ quantitative presence research in that the authors’ aim was to “shed light on the physiological data, with a view to investigating the viability of using physiological responses to automatically detect BIPs without requiring participants to signal them” (Garau et al., 2008, p. 294). Where previously presence research measuring BIPs required participants to signal when they felt a BIP, this research was focussed toward the understanding of how participants subjectively characterised and whether they experienced them as BIPs. This meant that the findings could inform further exploration of non-obtrusive ways of identifying BIPs during a mediated experience. Therefore, this research was about the experience of the user within mediated experience; how participants viewed themselves interacting within a virtual environment. The content analysis methodology was used to locate themes within the interview transcripts that related to the research questions and the thematic analysis was used to provide an in-depth view to the data. Although there is no mention of the use of Grounded Theory in the Garau et al. (2008) study, more recent research methods within qualitative research locate thematic analysis or thematic coding as a process performed within ‘major’ analytic traditions such as Grounded Theory rather than a specific approach in its own right (Frosch, Krueger, Hornik, Barg & Cronholm, 2007; Ryan & Bernard, 2000). It could be argued that whilst content analysis and thematic analysis are not strictly ‘true’ Grounded Theory, Braun and Clarke (2006) are two of many researchers within qualitative analysis that argue that “Grounded Theory seems increasingly to be used in a way that is essentially Grounded Theory ‘lite’ – as a set of procedures for coding data very much akin to thematic analysis. Such analyses do not appear to fully subscribe to the theoretical commitments of a ‘full-fat’ Grounded Theory” and that “a ‘named and claimed’ thematic analysis means researchers need not subscribe to the implicit theoretical commitments of Grounded Theory if they do not wish to produce a fully worked-up grounded-theory analysis” (Braun & Clarke, 2006, p. 81). Both Glaser and Strauss (1967) and Charmaz (2006) permit a thematic analysis of content data in mixed methods research projects through open coding (the analytical process of examining, comparing, and categorising qualitative data to develop thematic concepts) and axial coding (coding similar data sequences to foster connections between emerging thematic concepts).
For post-experiment interviews in presence and immersion related research, Garau (2003), Thomsen (2004), Jennett, Cox and Cairns (2008), and Pace (2008) all used methods such as interviews and questionnaires which were analysed using some form of Grounded Theory. Garau (2003) researched the contribution of different levels of virtual human (or ‘avatar’) fidelity to social interaction in virtual environments and tested this through both qualitative and quantitative methods. The research explored the lower boundaries of fidelity by investigating how different levels of responsiveness, photorealism and behavioural realism affect people’s experience of interacting with virtual humans. The qualitative methodology for the data analysis was Strauss and Corbin’s (1998) Grounded Theory method adapted and used for the study with the rationale being that the focus was on the investigation in light of participants’ own experience or perspective and that Grounded Theory is ‘tailored’ to the exploration of complex phenomena. Garau’s (2003) study is one of a few specifically within presence research that specifies and details the use of Grounded Theory as a method or methodology.

There are several studies integrating flow, immersion and presence using a Grounded Theory methodology. Pace (2003) uses Grounded Theory analysis to understand the flow experiences of web users where the aim of the research was to build upon current theory and knowledge of the causes and effects of enjoyment in computer usage; the experience of web users.

Jennett, Cox and Cairns (2008) are some researchers within the field of immersion and gaming who propose that there are numerous differences between virtual reality systems and gaming. Whereas presence in virtual reality systems is immediate, presence in gaming is gradual and gamers “willingly submit to the rules of the game, learning arbitrary relationships between the controls and the screen output, and take on the persona of their game character” (Jennett, Cox & Cairns 2008, p. 216). Conversely, some researchers claim that presence and immersion are the same concept. Brown, E. and Cairns (2004) claim that when individuals are gaming and describe themselves as being “in the game”, it is assumed that they are experiencing a sense of presence; that is; they feel like they are physically within the virtual environment (Brown, E. & Cairns 2004). However, Jennett et al. (2008) argue that their findings from their Grounded Theory study on gaming and “being in the game”
suggest that at the highest state of immersion not everybody experiences presence differs from the Brown and Cairns’ (2004) research on gaming, immersion and presence. The Jennett et al. (2008) study, through Grounded Theory data analysis, revealed that although they were highly immersed, some participants claimed that they were always aware of being in the game (i.e. no sense of presence) even at their highest state of immersion. Conversely, some gamers were immersed to such an extent that they became highly involved in the narrative and felt like they were the character (i.e. a sense of presence).

4.3 The Research Process and its Implementation

A retrospective overview of the research process

Figure 4.1 presents an overview of the research process that developed iteratively over several years commencing with formal acknowledgement of the need to better understand the synthesis stage of designing. As conveyed in the diagram, the study initially commenced with a focus on student designing and their experience of designing particularly in the early stages when there is heavy reliance on imagining. Three focus group sessions were held, the first two involving undergraduate design students (42 and 20 respectively) and the third involving 10 postgraduate design students (Figure 4.2). After each focus group data were analysed as well as research quality with the view to more descriptively identify and refine emerging themes.
Figure 4.1: Research structure
With very little emerging from analysis of undergraduate student data, a decision was made to include postgraduate students, who it was thought in addition to having more design experience and content to draw on, may also be able to better articulate their design process. While these students had difficulty in expressing their imagining process prompting the decision to involve design practitioners with greater experience and confidence, it did draw attention to the notion of presence and how research in this area may inform this study on imagining.

Traditional research relies upon a literature review to help contextualise the study, define the research question or hypothesis, and then provide a theoretical basis for interpreting and substantiating the value of the research findings. This leads to the formation of a hypothesis, which is then tested through experimentation. However, in this Grounded Theory informed study, the research began with an open and untethered set of ideas and a desire for process and outcome to emerge and grow iteratively through empirical research and theoretical sampling. Glaser (1992) argues
that in commencing a research project, the researcher should use an open sampling technique where the researcher may look for persons, sites or events where he or she can purposefully gather data related to categories, their properties and dimensions.

As conveyed in Figure 4.1, extant literature and theory played a different role. In this study, published literature and existing theory were treated as data and analysed in the same way as the data collected first-hand. Literature and existing theory were accessed when directed to do so as a result of previous analysis of literature and first-hand data. The process was guided and directed by the principles of theoretical sampling and constant comparative analysis in clarifying and refining emerging themes until they were ‘saturated’ (Figure 4.3).

As described recently by Birks and Mills (2011):

In Grounded Theory research, the aim is to build theory through the construction of categories directly from the data. Through ‘theory-directed’ sampling, you are able to examine concepts from various
angles and question their meaning for your developing theory (Strauss, 1987, p. 276). What is obvious? What is notably absent? Is something more obscure being suggested? Questions such as these are raised through the process of constant comparative analysis. (Birks & Mills (2011, p. 69)

Because of this unique characteristic, Birks and Mills (2011) explain how it is not possible to know at the outset of the study:

- The nature and type of data that will be needed to develop theory
- How many participants and data sources will be needed
- When, where and how data will be collected (Birks & Mills, 2011, p. 70)

Before providing further detail regarding selection of data sources, the following section explains the notion of quality in qualitative research and how this is interpreted in the context of a Grounded Theory informed study.

**Research quality**

Qualitative research is based on subjective, interpretive and contextual data; whereas quantitative research attempts to control and/or exclude these elements (Auerbach & Silverstein, 2003; Glaser & Strauss, 1967; Maxwell, 1992; Strauss & Corbin, 1998). Thus, the positivist viewpoint of validity and the canons of ‘rigor’ that are applied to quantitative research are not entirely applicable to qualitative research (Maxwell, 1992; Strauss & Corbin, 1998).

‘Quality control’ approaches in quantitative research include reliability and validity, where the former is about whether the reported results can be relied upon and concerns the ability to replicate the research elsewhere and still produce comparable results. Validity considers whether the research is actually measuring what it proposes to measure and includes both internal validity and external validity. Such standards are not meaningfully applicable given the premises of qualitative research. The concept of replication does not apply because of the emphasis on context in qualitative research: “The concept of replication changes meaning when the experiences and behaviour of individuals are considered as dependent upon context.
No two things are exactly alike, so the similarity of any two events is an abstraction” (Stiles, 1993, p. 596). Likewise, the notion of validity, in the sense of measuring objective facts, is not reconcilable with the epistemological foundations of qualitative research. Validity in qualitative research takes on a different angle, placing emphasis on the balanced understanding and interpretation of respondents’ meanings rather than on the discovery of external facts (Merrick, 1998).

Several alternatives applicable to Grounded Theory have been proposed. Respondent validation is an alternative that involves ensuring that the researcher’s analysis seems logical and convincing to the respondents themselves. However, as Pidgeon (1996) argues, whilst this procedure is desirable in theory, it is not always possible in practice to contact respondents after the data gathering stage. Pidgeon also proposes another approach which is a link with inter-rater reliability, ensuring that whilst undertaking the ‘doing’ of research, the researcher should create an ‘audit trail’ and make it available to other researchers, so that the process of theory generation from raw data can be validated by others (Pidgeon, 1996). Another option is to use negative case analysis, which involves actively seeking out cases that challenge the emerging theory in order to generate new insight. However, this presumes that the sampling and analysis stages are intertwined. Merrick (1998) and Stiles (1993) propose reflexivity, another issue that receives particular attention in discussions of evaluation criteria. This approach calls for researchers to acknowledge their role in the research by documenting how their views changed in the course of the analysis, implying that the researcher has an open and ‘permeable’ relationship with the data (Stiles, 1993). Even with the above arguments, all research is acknowledged to imply some degree of bias, best countered through a willingness to be surprised: “Despite our biases, we do in fact disconfirm our expectations all the time. Our ability to be surprised, to change our minds, to come to a new understanding, demonstrates that our initial biases are not immutable” (Stiles, 1993, p. 613).

More specifically related to Grounded Theory, Strauss and Corbin (1998) express a particular concern about bias, stressing the importance of constant comparison to ensure a genuine fit between data and the emerging theory: “We recognise the human element in analysis and the potential for possible distortion of meaning. That is why we feel that it is important that the analyst validate his or her interpretations
through constantly comparing one piece of data to another” (Strauss & Corbin, 1998, p. 137). Constant comparison is an aspect of what Birks and Mills (2011) refer to as procedural precision, which together with methodological congruence (involving alignment of personal philosophical position, research aims, and methodological approach), are influential in affecting research quality. In addition to demonstrating procedural logic through processes like constant comparison, maintaining an audit trail for transparency and accountability reasons is also crucial. Memoing is central to this reflexive practice. Memos are “records of thoughts, feeling, insights and ideas in relation to a research project” (Birks & Mills, 2011, p. 40). An example of memoing in this study is discussed in the data analysis section below. In the reflexive mode, writing about actions and feelings also includes analysis of impact and outcome (Birks & Mills, 2011, p. 53).

Finally, research quality also demands attention to ethics. According to Kvale (1996), ethical conduct involves:

- Informed consent: all participants for the study should be given sufficient information about the research procedures so they can make an informed decision about their participation. Their consent must be given prior to the data collection phase.
- Right to withdraw: participants must be made fully aware that they are free to withdraw at any time without any penalty.
- Confidentiality: information acquired about the participants during the course of the research must be kept confidential

In relation to this study, primary data collection, including the initial purposeful sampling process, did not commence until full ethical clearance was received from the QUT Ethics Committee. Copies of relevant documentation are provided in the Appendices.

**Data collection – selecting and recruiting data sources**

There were five distinct stages of data collection within this study. The first three stages were vital in aiming to understand the phenomenon of imagining during the abductive-synthesis stage in the design process, a significantly complex activity. As
data collection is a highly specialised process, it was also necessary to learn what to ask, and how to ask the correct questions to elicit the required information on a certain phenomenon. Additionally, the early stages of data collection (stages 1-3) required the researcher to examine and consider a variety of evaluation methods and data sources, planning the study and the methods employed. With each stage, it was important to revisit and carefully evaluate the questions and which methods could actually provide the answers to the given questions. As the researcher was seeking to understand how designers design and exploring the right questions to ask participants as well as choosing the correct method of data collection and analysis, stages one to three were considered exploratory studies only; the outcomes were used to inform the data collection methods in two stages of the primary study. The planning of the method of data collection and analysis during stages one to three enabled the researcher to learn techniques to utilise time in a more effective and efficient way, develop a new and critical way of thinking through the use of sifting and sorting techniques, and inform the understanding of the phenomenon through the exploration of diverse sources. Figure 4.4 below illustrates the five stages of the study.

![Figure 4.4: The five stages in this study](image)

For stage one of the exploratory data collection, 42 students from a three-year university interior design course participated. Although the data from this study were not intended to be formally included in this thesis, an ethical clearance was deemed necessary and was undertaken according to the guidelines of the QUT Ethics Committee. Participants were recruited through email and each participant was given the option to consider if they wanted to take part in this study; a total of 60 students were invited to participate and 42 students agreed to take part. The 18 students who did not wish to participate in the study did not cite a reason. Of the 42 students who
did participate, all were undertaking Interior Design Interior Design 4, a core interior design unit delivered in second semester of second year in a three year degree. There were 34 females and eight males with less than 10% of the class working within design practice or having had experience working within design practice. The results of this exploratory study from these students served as the ‘backbone’ for this study, but as stated above, the results are not discussed in this thesis. Data were collected through several unstructured group interviews that centred on imagining and designing. An example of the questions is provided in the exploratory data collection – the semi-structured interview section below.

When the data through this initial purposive sampling were analysed, it became apparent that more information was needed to saturate the emerging categories. Consequently, stage two of the exploratory data collection was undertaken involving four focus groups of five students in each group nearing completion of their degree (Figure 4.5). Participants for stage two were recruited in the same manner as stage one, discussed above. Twenty-eight students were invited to participate with a total of 20 students agreeing to contribute to the study. The eight students who did not wish to participate in the study cited being busy as a reason. Of the 20 students who did participate, all were undertaking their final year studies in a four year design degree majoring in interior design and architecture. There were 14 females and six males, with more than 85% having had design practice experience.

Making strategic decisions such as this about what or who will provide the richest data constitutes what is known in Grounded Theory as theoretical sampling. The focus group data from stage two were then analysed as part of the constant comparative analysis method further highlighting the need for additional new sources of data. For stage three of the exploratory data collection, the source of data was opened up to include five landscape students as well as five architecture students undertaking postgraduate study who were recruited in the same manner as in study one and two. Of the 10 students who did participate, there were two females and eight males, with all having had at least three months design practice experience.

The data collected through these focus groups were analysed using an intermediate level of coding and ultimately informed the development of the primary data collection. For stage one of this process, potential participants were sent a
questionnaire by email and of the 482 people who were sent questionnaires, 54 individuals responded and returned completed questionnaires. The data were then subjected to advanced coding and theoretical integration with the second and final stage of the primary data collection; the interviews providing theoretical saturation for the study.

In order to source participants for stage two of the primary data collection, approximately 45 architects and interior designers from South East Queensland were emailed and telephoned regarding the study and were invited to participate. Of these, 24 agreed to the study but ten participants withdrew at the last minute citing work commitments. Following a further two last minute cancellations by participants, fourteen interviews were undertaken and 10 interviews were transcribed; four were not transcribed due to very poor audio quality due to the environment they were recorded within. Further efforts were made to source more participants but potential participants refused citing work commitments or agreed to the interview, then cancelled. Respondents also took an average of three weeks up to more than a month to respond to requests for interviews, thus constraints of time and availability of subjects prevented the gathering of more data for this study. Only those who had a minimum of five years’ experience with several completed projects were selected for the study because the interviewer required information about the initial aspect of their personal design process, the design process prior to the completed project and finally, the comparison afterward: was it similar to the space that they had pictured? Or was it completely different to the space that they had imagined? The intention was that if they had gone as far as achieving a ‘deeper’ imagining experience during the design process, the interviewer was interested to see whether the place they had ‘been to’ was different from the completed space, and if so, how different was it in terms of look and the feel of the space. It was also important that the projects that were to be discussed were completely new spaces, not those the participants had been to before. It was important that they were not recalling a space that they were familiar with, but rather, a completely new space. It was seen that there was a potential that memory could assist in certain experiences of the space they had been to previously, and this might cloud the experience and affect the outcome or their recollections.
The theoretical sampling assisted in the development, elaboration and refinement of categories of imagining as described by participants in this study through searching uncovered properties and dimensions of imagining, until no other were found. This process was not designed for searching for repeatedly occurring properties or dimensions of a category (Charmaz, 2006), but rather, was aimed at increasing the range of variation and analytic density of the categories, thus placing them on firmer and stronger theoretical grounds (Strauss & Corbin, 1998). Over the course of these stages, the researcher became more immersed in the data with the level of theoretical sensitivity to analytical possibilities increasing.

**Exploratory data collection – the initial semi-structured interview (Stage 1)**

A semi-structured interview was chosen for the exploratory study for greater flexibility and potential to yield rich and varied data through the participants playing a central role in shaping the direction of the interview. This is in comparison to a structured interview where the questions are short and rather specific and tend to appear formal to the participants. Questions asked included:
• Do you experience a sense of ‘being present’ whilst within the ‘act of creation’ of your interior space?

• How could you describe your sense of ‘being present’ (experience) that you experience within your virtual interior environment?

• How does this inform the design of your physical interior environment?

• What do you believe sense of ‘being present’ to be, thinking about the moment when you are immersed in the creation of your space?

• When in the act of designing this ‘space’, do you ‘engage’ emotionally with the space in the virtual environment?

• Do you believe that immersion, or the perception of being enveloped, plays a part in experiencing sense of ‘being present’?

• Do you believe that sense of ‘being present’ results from a simple displacement of attention from the real world to the virtual environment, or must one become totally involved in the virtual environment to experience presence?

• Do you perceive yourself to be within your virtual space, or outside of it?

• Are you ‘lost’ in virtual space in much the same way as you are lost in thought?

• Are you considering the experience of the space whilst you are creating it?

• Do you think it’s important that we experience the sequences of experiences one can have within interior spaces? Does it matter or not?

• Do you believe that these experiences are those that satisfy human nature, or is the virtual environment a contrived environment that is far removed from the real world?

• Does interior architecture and design account for sequences of experiences, or the sense of sense of ‘being present’ within our built environments?

• Do you believe it necessary that these experiences are those that satisfy human nature, and even create a sense of the poetic? If so, why? If not, why not?

• Do you believe that is it important, or even necessary, that we apply the concept of sense of ‘being present’ to interior architecture, in the context of the built environment?
• Is it significant that our real environments are far removed (in terms of experiential translation) from contrived three-dimensional digital environments?

• Do you believe that there is a ‘merging’ of self and ‘place’, in interior architecture and design spaces today?

When the data were analysed from this initial stage the results indicated that the use of a questionnaire was valuable in terms of gathering data on imagining, however, as the students were not experienced designers, the results of the survey did not provide enough in-depth information about the abduction-synthesis stage in designing. As such, the participants were not able to sufficiently articulate their process, nor were they able to adequately reflect on their own design process. Furthermore, there were too many questions posed, thus causing the participants to ‘lose track’ of the line of questioning.

**Exploratory data collection – the focus groups (Stages 2 and 3)**

As the researcher was trialling the best methods of data collection in order to understand the phenomenon, rather than a semi-structured interview approach used in stage one, focus groups were used as a method of data collection for stages two and three. According to Kreuger (1988) focus groups can be used at the preliminary or exploratory stages of a study, can assist in exploring or generating hypotheses (Powell & Single 1996), and are also useful in developing questions or concepts for questionnaires and interview guides (Hoppe, Wells, Morrison, Gilmore & Wilsdon, 1995; Lankshear 1993).

As the primary purpose of focus group research is to draw upon the participant’s feelings, attitudes, beliefs reactions and feelings in a way which would not be feasible using other methods (e.g. observation, one-to-one interviewing, or questionnaires), it was seen that focus groups would be the best method for data collection in stages two and three. The questions asked in the focus groups for stage two included:

• Could you describe what happens when start designing something?

• When you are designing, what do you experience?

• When does it occur?
- How often does it occur?
- What increases the experience?
- What is it like?
- Do you perceive yourself to be within your imagined environment, or outside of it? Can you explain this?
- Finally, could you describe the difference of experiences between the first two questions?

The participants were also asked to rate on a scale of 1-7 with 1 = not at all; 7 = very much:

- When you are designing, to what extent do you feel like you are inside the environment?
- To what extent do you feel immersed in the environment?
- To what extent do you feel surrounded by your (imagined) environment?
- To what extent do you feel submerged in your (imagined) environment?
- When designing, do you experience a sense of being ‘really there’ inside the virtual environment? That is, do you experience a sense of ‘being present in the space’ whilst within the ‘act of creation’ of your interior space?
- Do you think that this could potentially inform the design of your physical interior environment?

The second focus group (stage 3) was a smaller group of students who were asked to provide their feedback on a further refined survey. However, this survey differed from stage two as the researcher trialled an edited form of the Presence Questionnaire (PQ) (Witmer & Singer, 1998). However, when analysing the data the results indicated that the use of quantitative methods did not adequately bring out the richness of data that qualitative methods can do when exploring a phenomenon such as imagining. The participants were asked to respond to a series of questions or statements which included:

- During your designing, to what extent were there times during the experience when the imagined space became ‘reality’ for you and you almost forgot about the ‘real world’?
I_____I_____I_____I_____I_____I_____I_____I

Not at all                somewhat              very much

- There were times during the experience when the virtual world of my imagination became more real for me compared to the ‘real world’

I_____I_____I_____I_____I_____I_____I_____I

At no time           somewhat       almost all the time

- When you think back about your experience, do you think of the space more as images that you saw, or more as somewhere that you visited?

I_____I_____I_____I_____I_____I_____I_____I

Images that I saw              somewhere that I visited

- When you are designing on the computer during the time of the experience, which was strongest: your sense of ‘being in the space’ you are designing, or of being in the real world?

I_____I_____I_____I_____I_____I_____I_____I

The real world                          the imagined space

- How much were you able to control events?

I_____I_____I_____I_____I_____I_____I_____I

None of the time    some of the time    all of the time

- How responsive was the environment to actions that you initiated (or performed)?

I_____I_____I_____I_____I_____I_____I_____I

None of the time    some of the time    all of the time

- How natural did your interactions with the environment seem?
I____I____I____I____I____I____I____I

Not at all       somewhat       completely at one with it

• How completely were all of your senses engaged?

I____I____I____I____I____I____I____I

Not at all       somewhat       completely at one with it

• How much did the visual aspects of the environment involve you?

I____I____I____I____I____I____I____I

Not at all       somewhat       completely at one with it

• How much did the auditory aspects of the environment involve you?

I____I____I____I____I____I____I____I

Not at all       somewhat       completely

• How aware were you of events occurring in the real world around you?

I____I____I____I____I____I____I____I

Not at all       somewhat       completely

• How compelling was your sense of objects moving through space?

I____I____I____I____I____I____I____I

Not at all       somewhat       completely believable

• How inconsistent or disconnected was the information coming from your various senses?

I____I____I____I____I____I____I____I

Not at all       somewhat       very much

• How much did your experiences in the imagined virtual environment seem consistent with your real-world experiences?

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How completely were you able to actively survey or search the environment using vision?

I_____I_____I_____I_____I_____I_____I_____I

Not at all                somewhat              very much

How compelling was your sense of moving around inside the virtual environment?

I_____I_____I_____I_____I_____I_____I_____I

Not at all                somewhat              completely

How closely were you able to examine objects?

I_____I_____I_____I_____I_____I_____I_____I

None of the time    some of the time    all of the time

How well could you examine objects from multiple viewpoints?

I_____I_____I_____I_____I_____I_____I_____I

Not very well            somewhat                very well

How well could you move or manipulate objects in the virtual environment?

I_____I_____I_____I_____I_____I_____I_____I

Not very well            somewhat                very well

To what degree did you feel confused or disoriented at the beginning of taking a break from your designing?

I_____I_____I_____I_____I_____I_____I_____I

Not at all                somewhat              very much
• How involved do you think you were in the imagined experience?

I____I____I____I____I____I____I____I____

Not at all  somewhat  very much

• When using the computer: How quickly did you adjust to the virtual environment experience?

I____I____I____I____I____I____I____I____

Not very well  somewhat  very well

• When using the computer: How proficient in moving and interacting with the virtual environment did you feel at the end of the experience?

I____I____I____I____I____I____I____I____

Not very well  somewhat  very well

• When using the computer: How much did the visual display quality interfere or distract you from performing assigned tasks or required activities?

I____I____I____I____I____I____I____I____

Not at all  somewhat  very much

• When using the computer: How well could you concentrate on the assigned tasks or required activities rather than on the mechanisms used to perform those tasks or activities?

I____I____I____I____I____I____I____I____

Not very well  somewhat  very well

• When using the computer: Did you learn new techniques that enabled you to improve your performance?

I____I____I____I____I____I____I____I____

Not at all  somewhat  very much
• When using the computer: Were you involved in the experimental task to the extent that you lost track of time?

I____I____I____I____I____I____I____I

Not at all  somewhat  very much

Primary data collection – the questionnaire (Stage 1)

As explained previously, stage one of the primary data collection involved experienced design practitioners invited to participate through a nationwide electronic questionnaire that was divided into three sections. The first section dealt with statistical information about the designer; the second section concerned designing in general; and the third section focussed on how the designer designs. The questionnaire was distributed to design practitioners. The questionnaire (see Appendix B) was developed in part from findings of previous studies into the related area of presence. Included were aspects of presence questionnaires from Witmer and Singer (1998), Slater and Steed (2000), Lessiter, Freeman, Keogh and Davidoff (2001), and Schubert et al. (2001). However, unlike the standard presence questions, the questions relate to the particular experience of imagining in designing rather than general experience of presence. These dimensions take a different approach to studies that focus on presence in virtual environments as they measure the cognitive aspects of designers’ experience during the design process. Although Slater (2004) asserts that questionnaires are problematic in the context of measuring presence and may be more reliable and useful if their results are integrated with qualitative results and with physiological data, it was seen that, for this study, data from the questionnaires analysed using a Grounded Theory methodology coupled with semi-structured interview data would provide a methodologically sound result. The questionnaire was also chosen as one of the primary data gathering instruments as it allowed for wide and efficient distribution and completion. Questions included:

• What is your understanding of the process of design in the conceptualisation and schematic stages?
• Do you think imagination plays a part in these early stages of the design process? If so, why; if not, why not?
• How important is it to you to consider the emotive qualities of what you are designing? Why or why not?
• When you commence a design process, can you please describe the process you go through from conceptualisation to design development?
• Could you describe the role of visualisation in the process you described above?
• When you are visualising, where do you imagine / perceive yourself to be?
• Do you see yourself and /or others as undertaking an activity within the space? Could you describe this?
• What facilitates the imagined experience; what contributes to it?
• In your mind, do you engage with this space in a physical manner – for example, do you feel temperature, hear sounds and ‘see’ light?
• At the start of the design process, do you visualise the outcome in some way? If so, please describe.
• Could you describe what you ‘see in your mind’s eye’ whilst designing?
• Is the outcome of your design usually similar to what you had originally ‘pictured’ or imagined it to be? Please describe.
• When you are designing, how conscious are you of the world in which you are physically located? For example, your office environment, other people, etc. Please explain.

Presence is most commonly measured using post-experimental questionnaires and, as discussed above, Sheridan (1992) argues that presence is a subjective sensation or mental manifestation and should primarily be assessed using subjective methods. Participants were not directly asked about how present they felt during designing; only one issue was addressed in a singular question and all questions were consistently open-ended questions that encouraged more than a simple positive or negative answer. The type of medium used in designing was not emphasised in the questionnaire as the focus was not on the ‘tool’ (sketching/digital) of designing, but rather around the thinking during designing – abduction-synthesis. Prior to sending
out the final questionnaire, numerous iterations were tested on several people with designing experience.

The questionnaire was distributed to people within the design community – architects and interior designers. The participants were informed that as there are differences in the two groups, some people may have found several questions rather unnecessary or obvious, whilst others may find them difficult to answer, but it was stressed that it was important that they answer all the questions so that responses could be compared between the different groups of people for each question and that there were no right or wrong responses. Figure 4.6 conveys the participation rate to the survey request.

![Figure 4.6: Questionnaire response rate](image)

**Primary data collection – the interview (Stage 2)**

People who worked in design practice as architects and interior designers in various small and large-scale practices throughout South East Queensland were recruited as participants. Data were collected through semi-structured interviews. One face-to-face taped interview, using a loose interview ‘guide’, was conducted with each of the 14 study participants. Interviews lasted approximately 30-60 minutes and were conducted at the participants’ convenience.

Using a similar procedure as the questionnaires, the participants interviewed were briefed with a short introduction stating the general purpose of the interview; that participation in the study was voluntary, that no negative consequences would arise for any participation. They were asked to sign a consent form prior to the beginning of the interview informing them of the researcher’s name, the degree being studied and the purpose of the research. The interviewer verbally assured participants that the recording and all responses were confidential and no information identifying
each individual was used in the recording process, rather a coding process was used by the interviewer in order to identify each interviewee. Finally, participants were informed that the interview would take approximately 35-50 minutes to complete. Questions addressed only one issue in a singular question and all questions were consistently open-ended, as explained above. Generally, the questions included:

- What is your designing experience?
- What is your process of design in the conceptualisation and schematic stages of a design?
- When you are visualising, where do you imagine / perceive yourself to be? Could you describe your experience?
- What do you experience in your mind’s eye when you start designing? That is, when you start the specific design of the three-dimensional space or form?
- Can you compare your experience in the act of designing – with some other (immersive) activity that engages you?
- Do you see yourself and /or others as undertaking an activity within the space? Could you describe this?
- Do you perceive yourself to be ‘within’ or outside of the space? And what increases the experience or what contributes to it?
- How important is it for you to consider the ‘feelings’ and ‘emotive qualities’ of what you are designing? Why or why not?
- In your mind, do you engage with this space in a physical manner – for example, do you feel temperature, hear sounds and ‘see’ light?
- Are you aware of other people being present or around you when you are designing?
- How do you think that the imagined space would be, or is different to the real space?

Creswell (1998) suggests that approximately 20 to 30 participants should be interviewed to achieve a sufficiently high level of detail to develop a theoretical model or theory. However, Strauss and Corbin (1998) argue that there is no specific number of participants a researcher should consider as a prerequisite to a study using Grounded Theory and explained that, rather than aiming for a certain quota for interviews, the most important aspect of sampling in Grounded Theory is to include
participants that represent different points of view regarding a phenomenon; in this case, the experience of, and cognitive aspects of imagining in designing.

Although the questions used in the interviews were similar to those used in the questionnaire, it was deemed necessary to refine these questions for the interview process to elicit more specific information, so the interview was tested and refined several times on separate participants before the final iteration. However, even using this process, it was found that different interviewees responded in different ways and that several of these interviews were still deemed less than successful as the interviewee did not understand the questions despite rephrasing the questions in a number of ways. As with the questionnaires, it was anticipated that data from the interviews analysed using a Grounded Theory methodology coupled with the questionnaire data would provide a sound methodological result.

The interview with each participant was exploratory in nature and involved open-ended questions, in order to abide by the Grounded Theory methodology stance of limiting the influence on participants (Strauss & Corbin, 1990). Additionally, in Grounded Theory methodology, it is the incoming information from participants that sharpens the focus of the research question and related general questions (Strauss & Corbin, 1994). The ethical clearance and questions posed to the participants are listed in Appendix B.

As discussed above, the interviews conducted with these participants were semi-structured. Semi-structured interviews differ from structured interviews in fundamental ways (Smith, 1995). Structured interviews are a method commonly utilised in survey research and have much in common with questionnaires in that they cover a set of predetermined questions adhering to certain categories. Questions are typically short and are often read out loud to the respondent in a specific order. While this methodology presents advantages for quantitative research in terms of control, reliability and speed, the negative aspect in terms of qualitative research is that little or no room remains for exploring avenues that do not fit into the predetermined categories. Using structured interviews tends to appear formal to respondents thus inhibiting the potential for responses that the respondent may discuss voluntarily that may provide a greater insight into the phenomenon being studied.
On the contrary, semi-structured interviews – while formal in terms of the research program aims and the assignment of roles to the interviewer and interviewee – preserve some of aspects of informal conversation. Semi-structured interviews are designed to generate a detailed description of respondents’ perceptions of a given phenomenon or issue. This allows flexibility and also it is not deemed necessary for questions to be asked in a set order or even to be phrased in the same way with each participant. This flexibility enables respondents to focus on those issues of greatest interest and relevance to them, thus potentially yielding richer and more varied data. In this sense, it is the participants who play a central role in shaping the direction of the interview. However, it remains the responsibility of the researcher to ensure that the interview does not stray from the intended topic or the general research question. A carefully constructed interview agenda aids with this (Smith, 1995; Willig, 2001) and should be designed in advance to identify logically ordered themes. This was the approach that was taken for this study. ‘Open’ questions were designed that could not be satisfied by a simple ‘yes/no’ answer, and every care was taken to avoid using jargon or asking leading questions in the interviews.

The interview questions were developed partly from the findings of the questionnaires as well as questionnaires used in presence research including those from Witmer and Singer (1998), Slater and Steed (2000), Lessiter et al. (2001) and Schubert et al. (2001). The interview guide contained a ‘set’ of standard questions for the interview, but some questions varied and some new questions were asked in order to elicit further information. Examples of the transcripts are in Appendix F illustrating the direction of the interviews.

Although recording interviews can potentially make some respondents less than comfortable, the advantage is that audio recordings preserve a more complete record of the interview than note taking alone (Smith, 1995; Willig, 2001). Semi-structured interviews are often used in qualitative research, so qualitative methods of analysis should be used in conjunction in order to open up new theoretical avenues (Smith, 1995). Depending on the type of analysis to be conducted, transcription can follow precise notation, signalling such details as pauses, false starts, interruptions and intonation. As discussed earlier, the method of qualitative analysis used in this research was Grounded Theory, which is concerned with the content of what is being
said and it is therefore only necessary to transcribe the words themselves (Willig 2001). The interviews used for the Grounded Theory analysis were transcribed partly by the author but in full by a transcribing service, due to time constraints. The researcher did check alignment of the completed transcripts with the audio tapes.

It should be noted that the respondent answers do not represent ‘best practice’ in terms of design process excellence. No data was collected as an objective measure of the design excellence expertise of the respondents, for example awards or other forms of professional recognition.

**Practicing designer participant demographics**

This section presents the demographic information collected from the participants in stages one and two of the primary data collection: design practitioners. Rather than of explanatory benefit the information is presented as background. The average ages of respondents are illustrated in the chart below.

![Figure 4.7: Age group of questionnaire respondents](image)

Thirty-four were male and nine female with 11 not revealing their gender in the questionnaire. Whilst every effort was made to include an equal balance of gender, the majority of participants were male. Four weeks after the first questionnaire was emailed out a repeat email was sent to those who had not responded to the initial email. The aim was to recruit more female participants in order to give a great gender balance. However, even with the email reminder, there were still fewer females than males who responded and 31% unknown gender.
In order to understand the participants’ education and time practising their ‘craft’, the first section focussed on several aspects including:

- The highest level of education completed
- The country in which the participant completed their education
- The design education
- The discipline of practice
- The discipline that the participant usually works within
- How long the participant has been working in this industry

This information was important as it was revealed that those participants who had little experience in designing had difficulty in visualising or imagining a designed outcome. There was a relationship between those respondents who had spent significant time practising their ‘craft’ and the ability to ‘place themselves’ within a design that was not yet complete.
Whilst every effort was also made to include more than a single discipline in this study, questionnaires were sent out to practising designers, including those within interior design and architecture throughout Australia, New Zealand, South East Asia and the EU (UK). It was found that a majority of those educated within architecture and practising within that discipline responded to the survey as illustrated below (Figure 4.10).

![Figure 4.10: Respondents’ primary area of design practice](image)

Finally, a significant amount of respondents’ level of education appeared to be at degree level, with some respondents having more than one tertiary qualification.
Figure 4.12: Level of education of questionnaire respondents

**Data Analysis**

This section focuses on the data analysis from stages one and two of the primary data collection involving design practitioners. In terms of the questionnaire data, these were analysed using manual tools, and then re-analysed using Leximancer. MaxQDA, a qualitative software package, which was initially trialled for entering codes. However, the use of MaxQDA was found to be hindering the process of becoming deeply familiar with the data and thus only manual analysis continued. The reasoning for the use of manual analysis over the use of digital tools was so the researcher could become more immersed in the data by noting, commenting and memoing on each of the participants’ responses. Analysis of the data began when all questionnaires were returned and after the first interview was transcribed, and the analysis continued throughout the data collection period using: *open coding*, where the data was examined to identify relevant categories; *axial coding*, where the categories were refined, developed and related; and finally, *selective coding*, where the central category was identified and related to other categories. To remain theoretically sensitive the research kept the following questions at the forefront when undertaking the different levels of coding: ‘what is this data a study of?’; ‘what category of codes does this event indicate?’ and finally, ‘what is happening here in the data?’ According to Glaser (1978) and Charmaz (2006), these questions greatly assist the researcher in keeping theoretically sensitive and focussed when collecting, coding and analysing data.
As is typical for Grounded Theory procedure, the data were analysed as a line-by-line process while constantly coding each sentence. Glaser (1978) states that this approach firstly, forces the researcher to verify and saturate categories and minimises missing important information, which become categories; secondly, it produces dense, rich theory; and finally, aims to ensure that nothing has been overlooked or left out. The same data analysis method used for the questionnaires was used for the interviews and is represented graphically in Figure 4.13.
Figure 4.13: Application of data coding levels for the study

“I find myself really concentrating” while “I’m designing”

“I am totally absorbed while trying to develop my concept”

“if I’m thinking really hard, the design space is at the core of my focus”

“I am transcended”

“When deep in the initial concept design stage, this can be a bit of an ‘out of body experience’”

“I am oblivious to chat what is happening around me”

“I transport myself to the place I am designing”

“At the point of designing I am completely transcended into a different time and space”

Data from questionnaires and interviews

Data fractured into *open coding* process
Each piece of data named

Similar ideas grouped into concepts

Concepts abstracted into categories (*axial coding*)

Description of categories organised into properties (*selective coding*)

Grounded theory constructed

Data examined and questions refined

Data from refined focus groups

Focus

*absorbed*

*non-conscious* behaviour

*transcended*

visceral

*concentrated*

Non-conscious participation

Imagining

Reacting

Experiencing

Tangible

Mental process

Mental activity

Non-tangible

(physiological response to activity)

Certain activities in designing involve mental processing which is visceral and difficult to articulate
Open coding, using a line-by-line approach, helped identify the categories and discover their properties and dimensions. Categories were then reported, including the frequency of their occurrence. During axial coding, the categories were interconnected. Categories were related to subcategories that answered questions about the phenomenon described by the category. As the coding process continued, some of the categories became subcategories because of their ability to provide greater explanatory power to a category. In selective coding, a basic social process was identified. A constant comparative approach was used until saturation of the categories appeared.

Every time a unique characteristic emerged, a category was created. These categories were then studied and condensed into manageable concepts with appropriate descriptors assigned to each category. The data were reviewed again with the descriptors written beside each response. The descriptors were organised into major codes as described and shown in Table 4.2 below. Finally, categories were further refined and graphics were created to better illustrate the characteristics of the outcomes. These are shown in Appendices E and F.

Several ‘general themes’ emerged from the preliminary readings of the data, completed without the use of computer software programs, as discussed earlier. Computer software programs such as Leximancer and MaxQDA were used initially to provide additional views of the data but remained auxiliary to a predominantly ‘mechanical’ Grounded Theory approach. While the outcome displayed consistency across analogic and digital approaches, it should be noted that non-digital analysis provided a richer and more detailed explanation of imagining in the design process.

As is described by Grounded Theory theorists, although the three phases of coding are logically distinct and serve different purposes (Table 4.2), they often occur concurrently, most typically in the simultaneous use of open and axial coding.
<table>
<thead>
<tr>
<th>Open coding</th>
<th>Axial coding</th>
<th>Selective coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasis</td>
<td>Classification</td>
<td>Identifying relationships</td>
</tr>
<tr>
<td>Main tasks</td>
<td><em>Labelling:</em> naming concepts</td>
<td>Systematically linking categories with their subcategories, and with other categories at the dimensional level. Coding for structure and process using the paradigm.</td>
</tr>
<tr>
<td></td>
<td><em>Microanalysis:</em> defining and developing categories in terms of their properties and dimensions</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2: Summary of the main analytical levels in Grounded Theory

Open Coding
The fundamental purpose of the open coding stage is to move from description to conceptualisation:

In doing our analyses, we conceptualise and classify events, acts, and outcomes. The categories that emerge, along with their relationships, are the foundations for our developing theory. This abstracting, reducing and relating is what makes the difference between theoretical and descriptive coding (or theory building and doing description). Doing line-by-line coding through which categories, their properties, and relationships emerge automatically takes us beyond description and puts us into a conceptual mode of analysis. (Strauss & Corbin, 1998, p. 66)

In the initial stages of data analysis for this study, the first stage was to analyse the raw data, thus ‘opening’ it up to expose distinct ideas. Figure 4.14 illustrates graphically the process of open coding, and Figure 4.15 is an illustrative example of
the identification of concepts and microanalysis in open coding for the interview transcripts.

Figure 4.14: The open coding process in Grounded Theory
Analysis began with a detailed labelling of all individual words that appeared to indicate significant concepts. In cases where a questionnaire or interview response contained a particular word or phrase, this was directly used as an ‘in vivo’ code.
This detailed, word-by-word coding was appropriate for the early part of the analysis, to avoid imposing preconceived classifications on the data. Coding was conducted later on by sentence or even by paragraph, depending on the data. This was done initially by writing notes and codes onto paper, and then the process was checked digitally, as explained above. This provided a greater familiarity with the data as well as an opportunity to reflect on the codes and memos written. Figures 4.16 and 4.17 illustrate this process in more detail.
Figure 4.16: Coding sentences in the data
141

Set of stakeholders: vague;

physical environment is part of a set of tangible tools. It's a part of the design process, it's a thinking process that's implicit and explicit.

The design process is not a set of rules. It's the design process. The design process is the design process. It's not a set of rules. It's a thinking process.

In the beginning, architecture is the designer, designing in a 'closed' and an 'open' environment. Architecture is the designer, designing in a 'closed' and an 'open' environment.

The idea of 'impression' is the process of conceptualizing the idea. The idea of 'impression' is the process of conceptualizing the idea.

Creating an experience, experience design, is a form of architecture. It's about the experience.

Architecture is about the experience. Architecture is about the experience.

Concepts: architecture, experience design, form, and form are important in context. Architecture speaks for itself.

But it's not the most important aspect.

Form is not primary. Form is not primary. Architecture is important.

Form is not primary. Form is not primary. Architecture is important.

Design process: for different projects, sometimes very structured and sometimes fluid.

Differences can change design process. Architecture is about the experience.

Architecture is about the experience.

sort of drawing it becomes more detailed and becomes clearer. I need to see this idea through more. I need to see this idea through more. I need to see this idea through more.

Communicating is about how it is in the mind. I can communicate a thinking of sensory images. I can communicate a thinking of sensory images.

I can communicate a thinking of sensory images. I can communicate a thinking of sensory images.

I just have to communicate it.

It's difficult to design anything good when you are distracted.

I just have to communicate it.

I just have to communicate it.

The problem is in the mind. I just have to communicate it.

The problem is in the mind. I just have to communicate it.

The problem is in the mind. I just have to communicate it.

I find that, reflection, upon process, perhaps rather than the static images of daydreaming, there is a process of dynamic daydreaming. There is a process of dynamic daydreaming. There is a process of dynamic daydreaming.

It happens as an experience. It happens as an experience. It happens as an experience.

It happens as an experience. It happens as an experience. It happens as an experience.

It happens as an experience. It happens as an experience. It happens as an experience.
Figure 4.17: Creating categories from codes in the data
As the labelling process in this stage was a form of description, it did not create new meanings; labelling was usually accompanied by microanalysis, which involved close examination and comparison of concepts from the data. Similar or logically related concepts were then grouped into more abstract units of analysis called categories. Microanalysis was aided by the use of theoretical memos that record thoughts and impressions about how the emerging categories should be defined and interrelated, as shown in Figures 4.16 and 4.17 above.

Through this process of microanalysis, categories were explored for their properties and dimensions, as Strauss and Corbin describe: “Whereas properties are the general or specific characteristics or attributes of a category, dimensions represent the location of a property along a continuum or range” (Strauss & Corbin, 1998, p. 117). In other words, a dimension represents the measured extent of a property. The process of identifying properties and dimensions was particularly important since it was at the dimensional level that the connections between categories were specified. Moving from the raw data to concepts, then to categories, represented the first stage of the process of abstraction that was central to this study, which is also essential to a typical Grounded Theory analysis.

In identifying properties and dimensions from the data, Charmaz (2006) suggests asking questions about the data being coded: “What is going on? What are people doing? What is the person saying? What do these actions and statements take for granted? How do structure and context serve to support, maintain, impede or change these actions and statements?” (Charmaz, 2006, pp. 94-95). Taking these questions into account, the properties and dimensions within the data were shaped considering the physical and mental experience and actions of the participant’s descriptions of designing. While the goal of the study was to explore imagining as a characteristic of designing involved in the conceptualisation and schematic stages of the design process, a broader understanding of the design process as a context for imagining was also considered necessary. This is described in detail in Table 4.3 as follows.
<table>
<thead>
<tr>
<th><strong>Properties and dimensions of designing</strong></th>
<th><strong>Examples</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behaviours, specific acts</strong> – how one acts on things; ‘the way that you act’ – these acts are usually shorter in duration and are not usually repeated often: it is a specific response to something. It is the action or reaction of something</td>
<td>A project given as an example, a specific example of a client</td>
</tr>
<tr>
<td><strong>Events</strong> – short once in a lifetime events or things people have done that are often told as a story. Events are more likely to be in the data from the interviews, rather than the questionnaires</td>
<td>Imagining, testing, thinking, exploring ideas, ‘getting the brief correct’, taking the time to explore and understand something about the site</td>
</tr>
<tr>
<td><strong>Activities</strong> – these are of a longer duration. They may be tangible (physical activities) or intangible (cognitive activities), involve one’s own actions or involve other people within a particular setting</td>
<td>Getting ideas onto paper so the design can be explored further and communicated</td>
</tr>
<tr>
<td><strong>Strategies, practice or tactics</strong>: ‘doing something in order to...’ These may also be tangible (physical) or intangible (cognitive)</td>
<td>Using the imagination to explore design concepts</td>
</tr>
<tr>
<td><strong>States</strong> – conditions experienced by people or found in organisations; emotional; conceptual; physical; existential</td>
<td>Placing self in the imagined space through the mind’s eye so as to understand the impact of design decisions</td>
</tr>
<tr>
<td><strong>Meanings</strong> – A wide range of phenomena at the core of much qualitative analysis. Meanings and interpretations are an important part of what directs participants’ actions. These can also be in-vivo codes.</td>
<td></td>
</tr>
<tr>
<td>a. What concepts do participants use to understand their world? What norms, values, and rules guide their actions?</td>
<td>Using CAD and 3D models</td>
</tr>
<tr>
<td>b. What meaning or significance it has for participants, how do they construe events, what are the feelings</td>
<td>“I felt transcended”</td>
</tr>
<tr>
<td>c. What symbols do people use to understand their situation? What names do they use for objects, events, persons, roles, setting and equipment?</td>
<td>“I was surprised that the design looked the way it did”</td>
</tr>
<tr>
<td>d. Responses are the designers’ perceptions, the</td>
<td></td>
</tr>
</tbody>
</table>
response to something. It is “what I believe”; a belief; a response; a reflection; a perception; an interpretation

| Participation – involvement. These may also be tangible (physical) or intangible (cognitive) and involve one’s own actions or involve other people within a particular setting | “I feel as though I am there in the space using the kitchen”
“I close my eyes and I am living in the building” |
| Relationships or interaction – with ideas; with people, with space | The building, the space and the interaction of the users
The site and the environment
Where the building sits on the site
“If I have a good relationship with the client/user of the space, then I feel I produce better designs” |
| Conditions or constraints – characteristics, qualities | “I can focus really well at home” (because I don’t have the distractions that I have at work)
“I produced a really good design” (because I knew the client really well)
“If I only have a small budget I am restricted in what I can design” |
| Consequences – This happens as a result of that | “If the client changes their mind over the course of the project, my initial imaginings will probably be remarkably different than the outcomes”
“As I have good design experience, I can develop solutions much quicker” |
| Reflexive – researcher’s role in the process, how intervention generated the data - this is only applicable in the interviews. What was it that I asked that made them give more information? | Probing question – “What do you mean when you say that?” |

Table 4.3: Properties and dimensions of designing (Adapted from Bogdan & Biklen, 1992; Strauss, 1987; Mason, 1996; and Gibbs, 2002)
The emerging categories
In analysing the data (example shown in Figure 4.17), categories began to emerge that highlighted various activities in the design process. Of particular interest were the mental activities in the early, conceptual abduction-synthesis stage of designing. The data revealed that while some information is explicit (such as pictures, sketches etc), in the early stages of designing a considerable amount is implicit and abstract. Data also revealed that these early stages of designing are highly intensive cognitively.

The strategies, practice or tactics used by designers during this intensive stage include gestation, which is ‘dwelling’ on a problem prior to committing anything to paper, and deliberate mental focusing on a design by ‘withdrawing’ from the work environment, and using music or some other form of media to allow for complete focus. How designers experience various physical or non-physical ‘states’ during imagining (including emotional, conceptual, physical or existential states) were also examined. Data revealed that designers describe some states as ‘transcended’ or ‘in another world’. Analysis of data also showed that designers employ focusing and defocusing as a device for shifting perspective during the design process and as a strategy for interpreting different aspects and sequences of the design situation.

As meanings and interpretations are an important part of what directs designers’ actions, these were also identified, explored and analysed and included as in-vivo codes. Questions were asked such as “What concepts do these participants use to understand their world?” and “What meaning or significance does this action or strategy have for participants; how do they construe events and what is their experience?” Designers use interpretation for the consideration and exploration of possibilities. Furthermore, designers attribute meaning to certain objects, situations and problems in complex but constructive ways through imagination. They do so by linking sensory matter (for example seeing, hearing, smelling, through memory) with connecting concepts, synthesising it into concrete and tangible design solutions.

Participation was considered a separate concept to ‘state’, even though there are some aspects that are similar to both. For example, some designers experience a state of immersion and participate ‘in’ the space during imagining. Data revealed that many designers ‘participate’ in activities in an imagined space, whilst some
designers involve others within a particular exercise in an imagined setting, both as a process of imagining alone, or by involving others in imagining exercises.

*Relationships or interaction* with ideas, people or space are considered to be important elements within this study. For example, the relationship the designer has with the client can either contribute or prevent the ability to gain a sense of immersion in the space whilst imagining. Additionally, designers use a process of creating relationships and connecting abstract conception (imaginal) and concrete (physical site) views, as well as the interaction of the design and its surroundings including cultural and societal context to produce desired outcomes through the interaction between the imagined world and the physical world.

Factors that can either cause or affect something occurring, that is, *conditions or constraints*, were coded in order to understand why designers undertake activities for the reason that they do. For example, some designers cannot become immersed in the space whilst imagining due to a noisy or disruptive external environment. These conditions have been reported as inhibiting the ability to focus. Other designers feel that they are able to produce an exceptional outcome based on a strong connection or relationship and interaction between themselves and the client. Related closely to this are *consequences*, which can be described as ‘this occurs as a result of that’. An example is that the designer may have to change the design from that first imagined because it ‘just won’t work’.

**Axial Coding**

The second stage of the analysis of the data was *axial coding*, a term used by Strauss and Corbin (1990) which is the “crosscutting or relating concepts to each other” or “the act of relating concepts/categories to each other” (Corbin & Strauss, 2008, pp. 197-198). The term ‘axial’ is “intended to denote the idea of putting an axis through the data, where an axis connects the categories identified in open coding” (Punch 2005, p. 209). According to Corbin and Strauss (2008), open coding and axial coding go ‘hand in hand’ and the distinctions between the two types of coding are ‘artificial’. Put simply, open coding breaks apart the data and identifies the concepts in the data, and axial coding puts the data back together by relating the concepts (Corbin & Strauss, 2008).
Beginning with an organised set of initial codes or preliminary concepts (listed in Table 4.3 above), the focus in axial coding was on the initial coded themes rather than on the data, which is the focus in open coding. Where open coding was about *identification* and *naming* of properties and dimensions, axial coding is about *links* and *relationships* as illustrated in Figure 4.18 below.

**Figure 4.18: Process of open coding and axial coding in Grounded Theory**

Within Grounded Theory, a category stands for a phenomenon, which is a problem, issue or event that respondents deem significant in describing their experiences. The categories from the data in this study can be seen in Figures 4.19 and 4.20 below. The purpose of axial coding is to form more defined explanations of phenomena, and this was the case in this study. Where a basic understanding of activities, strategies/tactics, meanings and interpretation, participation, relationships and interactions, and conditions of designing during conceptual design were revealed during the previous stage (open coding), along with their properties and dimensions as described in Table 4.3, various categories were revealed from each of the above codes. During the initial phase of classification it was not yet apparent exactly how they related to each other, so the primary task in the axial coding phase was to refine
definitions of categories while defining their interrelationships by linking them at the dimensional level. This process can be seen more clearly in the following figures which illustrate the connections between various codes and concepts which emerged from the data analysis.

Figure 4.19: Refining definitions of categories from the data
For example, from the category of activities, there are various ‘types’ of activities; those that may be purely physical, purely mental processing, or those which may be both. In terms of non-physical activities (as was the focus of the research questions), the terms imagining, thinking, (mental) filtering, focussing, day-dreaming and intuiting were categorised under mental processing. This then lead to examining the ‘types’ of imagining. For example, day-dreaming differs from (mental) filtering, as one can day dream in a ‘random manner’, but (mental) filtering implies some purposeful activity. From this, the code of imagining (and subsequent sub-categories) emerged, as the data revealed that although imagining is a critical part of everyday life, imagining during designing is has complex and somewhat elusive characteristics.
As can be the case in Grounded Theory analysis, additional codes and new ideas emerged during the axial coding stage and these were noted; however, the primary task of axial coding was to review and examine the initial codes which were identified in the open coding stages of analysis. The next step was the organisation of ideas or themes and identifying the axis of key concepts. During axial coding, the focus in the data was upon causes and consequences, conditions and interactions,
strategies and processes, and categories or concepts that cluster together (Neuman, 1991).

Table 4.3 shows the key properties and dimensions (codes) from the data which align with Strauss and Corbin’s (1990) paradigm model where coding looks for:

- Causal conditions
- Contextual factors
- Actions and interactions taken in response to the phenomenon
- Intervening conditions that assist or hinder actions and interactions
- Consequences of actions and interactions (Strauss & Corbin, 1990)

In the process of axial coding in this study, relationships between categories were explored and process related to structure as is recommended by Strauss and Corbin (1990). Here structure relates to the circumstances that explain why events occur, whereas process relates to how those circumstances are responded to. Furthermore, dealing alone with the why or the how of events would yield only a partial explanation of a phenomenon and that “one must study both structure and process to capture the dynamic and evolving nature of events” (Strauss & Corbin, 1998, p. 197). In order to facilitate the analysis relating to structure and process, they propose the use of what they call the paradigm, a conceptual scheme that helps to tease out the often subtle connections between categories. The paradigm consists of conditions, actions/interactions and consequences, which are included in Table 4.3.

It was necessary to consider structure in the data analysis for this study, as each circumstance in designing has its own subtle nuances, and as no person is the same as the next, so is each design situation. In terms of process, designers consider the structure and circumstances surrounding the design ‘problem’, then use design processes to ‘solve’ the issues, thus resulting in a resolution in the form of a system, a process, or a space. Within this process and the structure surrounding it, there are various activities that the designer must go through in order to ‘resolve’ the given ‘problem’. These include framing and sensemaking within abduction-synthesis during designing.
During the axial coding process, cases were sought that demonstrated a dimensional range or variation of a concept and the relationship among concepts, more formally known as *relational and variational sampling*. After concepts were revealed during the open coding stage of this study, it was necessary to understand the relationships between them, as described by Strauss and Corbin (1990). This can be seen in Figure 4.21 below, involving the *structure* of the problem (the relationship between the mental space and the physical space), and the *process* of imagining that were being revealed during data analysis.

![Figure 4.21: Examining the structure and the process between concepts](image)

The process aimed to maximise the differences between various and differing categories and examine the interrelationships between them. As the categories that were uncovered in the open coding stage were differentiated clearly, their significant interrelationships were revealed, as is the usual case suggested by Charmaz (2006). This maximisation of difference allows a dense development of the properties of categories and therefore defines the scope of the emerging theory (Glaser, 1978). New categories were uncovered in relational and variational sampling, as can be seen in Figures 4.22 and 4.23 below. This was evident from the data of each group of participants in this study who provided a source of possibly theoretically relevant categories that served as the basis for further variational or relational sampling.
Figure 4.22: New categories emerging from the data in axial coding
Selective Coding

The next step in the selective coding process in this study was to decide on fundamental categories which most essentially represented the main topics of the research, which is a process in Grounded Theory analysis described by Strauss and Corbin (1998), and Goede and Villers (2003), as the interaction between all important categories needed to be found (Creswell, 1998; Goede & Villers, 2003; Goulding, 2002; Pandit, 1996; Strauss & Corbin, 1998). In so doing, the central categories a) enabled a consolidation of other categories to explain the whole context, and b) represented a considerable variety of all categories (Strauss & Corbin, 1998). Several techniques aiding in determining the central category include writing storylines, drawing diagrams, and sorting memos (Goede & Villers, 2003; Goulding, 2002; Strauss & Corbin, 1998), all of which were carried out as part of the selective coding process in this study. This is illustrated through Figure 4.24, an extract from Question 3.6 in the questionnaire: “What facilitates the imagined experience; what contributes to it?”
Figure 4.24: Determining central categories from Question 3.6 data
Selective coding revealed that there were several key concepts emerging from the data. These included:

- **Imagining**
  - Context
  - Visualisation
- **Experience/experiential/aesthetics**
  - Process of imagining
  - ‘Being there’
- **Stimulation/simulation**
  - Visual
  - Text
  - External
- **Relationships**
  - Context/spatial/client
- **Clarity/focus**
  - Imagining
- **Understanding/context/visualisation**
  - Imagining
- **Familiarity**
  - Imagining

These concepts were then used to create a visual diagram in order to understand the relationships between the concepts, and to see what most essentially represented the research questions. This can be seen detailed in Figure 4.25.
In examining the entire data set, it revealed that the core categories related back to the experience of imagining, which explain further below.

During the third and final phase of analysis where the conceptual relationships were diagrammed (Figure 4.26), the key categories defined during the axial coding stage were integrated and refined to form a *theory*; in the case of this study, a theory of designers imagining during the design process.
In the case of Question 3.6, there were essentially four primary elements that facilitate the imagined experience:

1. The relationship that the designer has with the project/client – the better the relationship, the more able the designer is to ‘connect’ with the client’s wants and needs.
2. The amount of design expertise – the more the experience, the better able to imagine complex problems.
3. The ability to be able to focus in on the task at hand – the less distractions, the more immersed the designer is able to be within an imagined space.
4. Visual, auditory or sensory ‘triggers’ permit ‘cues’ to enable imagining to occur, such as music or reading.

It is important to note that this question is shown as an example of the analysis process and does not represent the entire data set.
At this point, it became much clearer that in all the data, even from the open coding process, imagination plays a key role in design activity. However, as discussed above, the activity of imagining is complex and cannot be categorised into one simple classification. At some times, imagining is conceptual; sometimes it is for aesthetic purposes in the existential sense. Imagining, mental models and mental modelling are linked with facilitating incubation, gestation and distillation at a subconscious level; a process that is understood as highly original and creative.

As described, one of the key steps in selective coding for this study involved identifying the core categories that were the most central to the abstract and descriptive categories. Even with the scope of the project, and with all the ‘unknowns’ in the design process, several central categories emerged from the overall data, linking to the majority of categories in the scheme and abstract enough to contain and explain them. This aligns with Strauss and Corbin’s (1998) premise regarding a core category: “A central category has analytic power. What gives it that power is its ability to pull the other categories together to form an explanatory whole. Also, a central category should be able to account for considerable variation between categories” (Strauss & Corbin 1998, p. 146). Once the core category was identified from the data, it then became possible to write a storyline describing the essential elements and interrelationships that form the theoretical whole. The typical Grounded Theory process is illustrated in Figure 4.27, and the process taken in this study is shown in Figure 4.28.
The process was one of integration and refinement of the theories that emerged within the previous stage of axial coding. The aim of the selective coding process was to integrate the categories at the dimensional level in order to a) discover a theory of imagining during the design process, b) validate the relationships between concepts that emerged in the data, and c) detect any categories which needed further refinement. These aims also align with Strauss and Corbin’s (1998) guidelines of selective coding. In this study it was found that:

- Designers imagine in different ways, using different ‘types’ of imagining for different reasons: for visualisation, for aesthetic purposes, and to understand context
- Imagining is central to, and related to all other major categories: imagining plays an essential role in the various activities of the design process
As the categories that were identified in the open and axial coding process were descriptions of data but not the theoretical framework, various types of categories needed to be integrated to develop the theoretical framework (Creswell, 1998; Goede & Villers, 2003; Goulding, 2002; Pandit, 1996; Strauss & Corbin, 1998). These categories can be seen in Figure 4.29, where the overall categories required integration in order to develop the theoretical framework of imagining in the design process.
In summary, selective coding contained three steps: a) discovery of central categories, which can be seen in Figure 4.29 as imagining/thinking; b) integration of central categories, which are doing/designing, space/project, process/thought/idea, experience/feel and people, and c) refinement of a theory, which links the core category to the central categories – imagining is central to the design process for designing spaces, it is an internal process which is experienced by people, and allows the internal ideas to be ‘made real’. These three steps are considered by Strauss and Corbin (1998) to be essential to the development of a central theory in Grounded Theory.

This Grounded Theory analysis did not aim to unearth a simple cause and effect relationship between predetermined variables but rather aimed to build a picture of
how they connect with each other, as has been illustrated above. As Strauss and Corbin iterate:

Identifying, sifting through, and sorting through all of the possible factors showing the nature of the relationships does not result in a simple ‘if … then’ statement. The result is much more likely to be a discussion that takes readers along a complex path of interrelationships, each in its own patterned way, that explains what is going on. (Strauss & Corbin, 1998, p. 130)

For this thesis, this discussion takes two forms: first, a descriptive (taxonomy) form; and second, an explanatory (model) form. As conveyed in the following chapter, one of the outcomes of analysis which became evident particularly at the axial coding stage was variation in how the designers understand imagining in the design process. These empirically grounded categories are labelled visual, aesthetic and (con)textual, and formed the focus for linking to other concepts and categories and a model for spatial design imagining.

4.4 Conclusion

This chapter has presented a detailed description of the methodological approach and process undertaken in exploring the phenomenon of imagining. As explained, Grounded Theory methodology was selected to inform and guide the study because of its strong philosophical alignment with the research context and its aims and objectives. In line with ‘good practice’ in Grounded Theory, the chapter has attempted to as transparent as possible, outlining in detail the research journey and processes of data collection management and analysis. The next two chapters present the outcomes of those processes in the form of a Taxonomy of Imagining and the Spatial Design Imagining (SDI) Model, representing the substantive theory emerging from the ‘ground’ of participant experiences and research interpretation.
CHAPTER 5: EMPIRICALLY GROUNDED IMAGINING

5.1 Introduction

This chapter focuses on the outcome of analysis of empirical data obtained from the participants of the study when describing their experiences of imagining in the spatial design disciplines. The first section describes how designers regard imagining in the context of the design process. The second section is the outcome of a closer scrutiny of imagining and the development of empirically grounded categories of imagining. The third section provides an outline of what designers consider to be the main enablers of, and barriers to imagining. When these are considered in the following chapter in relation to the outcome of the exploration of presence and design methodology literature, a theoretical foundation is established for speculating about a new theory of imagining in spatial designing in the form of the Spatial Design Imagining (SDI) Model.

5.2 Imagining and Designing

This section highlights connections between participants’ experience of designing and their understanding of imagining. For several designer participants, in the initial stages, designing is regarded as a highly qualitative and speculative process that oscillates between the brain and various external spaces, whether they are tangible spaces such as pieces of paper or virtual spaces produced by digital software such as CAD. They describe how ideas develop in both spaces but in different ways. While the externalised ideas are explored in an attentive and focussed way, their inception and further development in the brain is more unconscious or subconscious. Ideas are intentionally left to incubate before they are externalised and developed further in a more direct and conscious way. Integral to this is imagination and how it “allows you to see with the mind’s eye what has not yet been drawn” [wl]. As conveyed in the following response, the respondent believes that some people have the ability to do this effectively others do not and that the process takes place in its own time. When it is forced it is understood to lose its inspirational quality.

Really hard to quantify...In architecture it involves lots of space planning, head scratching, scribbling, getting ideas down on paper (or CAD), then letting it rattle around in my head for a while, then
working at it again. It is something that just happens, you either have it or you don’t. It can be forced, and that is often evident in the end result, which is often lacking in inspiration.

The need to allow an idea to gestate is described by several other designers as follows:

When I start a design process I just begin with scribbling and sketching out ideas. As soon as I think of one shape - form - concept etc another idea will pop into my head. I will keep drawing, researching and searching until I get an idea that I am fond of. Once I have this idea it is hard for me to stop thinking about it - I have to keep drawing it, from different angles and different shapes until the idea is fleshed out. Once I have the idea, I am content and can relax. I will leave it a couple of days then come back to it and re-think the idea, I will seek feedback... this will normally point me in a new direction.

My way of working is quite intuitive. I read widely and inform myself about all facets of the project, especially the social and cultural values of the community who will use my building. Then I leave this to accumulate unordered in my subconscious. Once I know all the hidden facets of the project as well as the functional requirements, I conceive a coherent spatial whole that brings together the diverse elements. This thinking often occurs in the early hours of the morning, and I have trained myself to think in precise spatial terms from the outset. If I can mentally conceive an answer, I am content to carry it around in my mind, which allows for further distillation of the embryonic solution... Since all this happens at a subconscious level, it is not clear to me precisely how it comes together ... it just does.

The preceding statements also reveal the interplay of different forms of cognition involving imagining, induction and deduction. In the following response, imagining...
is understood to play a central role in reflection and the development of a mental model providing the basis for externalised (physical or digital) modelling. This follows:

...the pragmatic stage of reading and understanding the brief first. Then there is some period of contemplation, arranging the spaces in my mind, developing a model concept. This is usually assisted with the use of freehand sketches, looking at photographs, visiting or revisiting other sites and recalling events, characteristics and emotions associated with other projects, both real and illusionary. Next is the start of committing to paper and then to computer modelling combined with continually adjusting the spaces and trying different sizes shapes or patterns to solidify the illusion. Finally the nuts and bolts part, the fine tuning, squeezing retrying layouts, exploring further layouts and moulding the shape, materials and finishes to achieve and visualise the concept, revisit the design brief check the regulatory requirements and finalise the computer model [pt].

For another designer:

Initial analysis of constraints and brief leads to a period of free form speculation from which one alternative is selected, sometimes arbitrarily as the matrix for exploring other aspects; structural, environmental, servicing and impact. Any of these aspects and others may prompt reconsideration of alternatives or refinement of the one used for initial investigation; at this stage it is important not to become fixed on one solution, which might block consideration of others. At this stage an attempt is made to express the site potential and the results of the brief; the exercise of explaining these aspects to clients usually firms up priorities. Then the ‘analysis-synthesis loop’ is followed until it is clear that one solution can meet the objectives in a way that optimises the site and resources available [dk].
Providing additional information, the following response conveys how designing also involves establishing constraints as part of defining a problem space for imagining and/or deducing potential solutions:

...Establishing parameters, imagining and/or deducing potential solutions, conceptualising these in built form, testing/review of assumptions/decisions made against outcome desired/required. Always being open to the unexpected and not discarding the ‘out of left field’ solutions or ideas without analysis [gr].

In addition, it reveals an appreciation of the need to translate ideas into built form providing a less abstract, more ‘real’ basis for reviewing assumptions as well as the decisions. The use of the term ‘review’ in conjunction with ‘testing’ suggests an appreciation of the qualitative nature of designing, with the outputs from imagining and deduction needing to be challenged and checked against desires as well as requirements. Overall, the process is regarded as speculative with outcomes regarded tentatively in terms of their potential. Even though the outcomes might be unexpected and emerge in unlikely ways, the participant recommends being prepared to at least analyse them first rather than ignoring them.

While the response displays hesitation in too quickly accepting an outcome as the final outcome, it also recognises the need to have a sense of whole early in the process in order to immerse oneself in it and vicariously develop further appreciation of the issues by acting out roles of those who have a connection to it. In this respect, imagination is understood to play a significant heuristic role.

At this stage you are trying to refrain from imposing the solution prematurely but you need to be able to place yourself within the overall context of the problem in order to form views of what the issues are and make sense of the project. You need for example at various times to “be” the client, the local authority town planner, the lending authority, the potential buyer, the builder, the tradesman, the neighbour, etc. Your imagination is what allows you to do this [mo].

Designing as involving a balancing act between the need to take action in an imaginative way and the need to be cautious and critical is conveyed as follows:
I think imagining plays a part, to some extent. It is important because it allows the creative process to start flowing. At the same time, it can be dangerous to start imagining a finished product this early in the process because there is the possibility that you will not be able to see past that original idea. It is important that you keep an open mind while designing and not get too attached to a particular design because it is always possible for a design to be worked further. Although imagining can be dangerous, it also helps to encourage you to design. When you can imagine the finished product or even a part of it, it helps to motivate you and connect you to the design [an].

And from other designers: “when managed or used well it [imagining] can be enormously productive and is often the main part of the amazing solution” [an], however, there still remains the need to balance between “the logistical and scientific aspects otherwise architecture is just a fashion statement and a neglect of duty by the architect” [ck].

Throughout the entire process of design, from the beginning to the conclusion of the project, designing is very much involved with relationships and processes during different stages, with respondents maintaining that the design process “is founded on the relationship between client, design consultant and the wider world, but it’s also about what the designer can bring to the table and how he [sic] brings it to the table (politics of persuasion)” [by]. “The two stages are enmeshed – it is the play between the idea and the possibility of the idea(s) that meets the client’s requirements on the one part and the designer’s possibility on the other” [tk].

One designer describes the initial design process as ‘synthesis’:

...synthesis of conceptual solutions to the issues [are] identified during the prior phase of understanding of the brief / definition of the design parameters. This synthesis is achieved through an iterative, evolutionary process, bringing to bear the capability of the designer to manage and apply their range of knowledge, experience and skill, to develop potential solutions, and then evaluate them against criteria established during the briefing phase, before moving to the
next iteration, keeping the positive aspects, and creating additional
ideas to replace the negative aspects, and so –on until the design
stands scrutiny against all relevant criteria [rn].

As conveyed in early statements, the process of designing is understood as iterative
and evolutionary, with the knowledge, experience and skill of the designer being
critical. Designers are divided in how they approach the initial stage of design. Some
strongly advocate that rather than designing around what is first ‘intuited’, or ‘seen
in the inner vision’, the activities should rather be about “getting the brief correct”.
For one designer, it is about:

Initially, attaining a good, workable brief with the client, then
designing a concept that matches the requirements to the
characteristics of the site, its location and its surroundings. Then,
with the client, reaffirming the brief, augmenting it as necessary and,
in the process judging whether the concept is comprehensive and
flexible enough to form the basis of refinement of the design [sh].

Visiting the site can help in finding an aesthetic theme or ‘hook’ for the project:

It depends on how you approach the site in the beginning; what time
of the day can influence the design process. If you go in the morning
sunlight may be flooding the site giving you warmth that you want to
capture. It may be a view, or the lack of privacy. It is more like
capturing a feeling, the essence of what the site says to you that you
try to capture in the design [wl].

Site and budget are everything. Architecture is about people’s use of
buildings and their surrounds, not an end in itself. For clients, begin
by looking for a ‘hook’, an inspiration, an angle that they are
passionate about, then push this to an extreme [jt].

Other strategies involve using design expertise gained though previous experiences
and projects. This is tapped into intuitively when working on a new project,
particularly informing the questions asked and interpreting subsequent responses:
A lot of experience is very helpful in undertaking the initial work because there is a lot of intuition involved in all aspects including asking the right questions to establish the brief, reading beyond what you are told, designing a concept that works extremely well and also has the potential not only for development into good, appropriate architecture but that also has the capacity, if appropriate, to be changed and augmented with the efflux of time [sh].

For other designers, there is the suggestion that the design solution will emerge inductively and deductively from the information collected: “to understand the brief and the context in all its aspects including economic, social, regulatory and physical in the belief that the design solution will emerge from these constraints” [mo]. Indeed, as expressed by one designer:

I was educated to consider that preconceived ideas of any kind inhibit the chance to achieve very good and even great architecture and I have had every reason to applaud that teaching. Until one has a full brief and full understanding of its implications and a full evaluation of the site and its surroundings and a full understanding of how the regulations governing the development of the site and the development of the category of building being sought will affect the design, any preconceptions are absolutely worse than useless [sd].

When asked about imagining in their designing, several designers used it in relation to ‘visualisation’, not only for themselves but also in arriving at a shared understanding with others:

I have used creative visualisation successfully across cultural differences with an Indigenous person working with me. It is a very powerful tool to assist people to understand the complexity of the design process and the range of factors and issues we take into consideration in a design process [bk].
The ability to visualise a 3D concept is a huge advantage to have confidence in exploring and examining any one (or a range of) solutions. It also requires the communication skills to convey the visualisation in ways that “connect” with the client and ensure confirmation of effective communication and understanding [jn].

While many designers use imagining to more effectively engage themselves and others with the design process and what is being designed, there was one designer who used imagining to distance themselves from the building and allow it to design itself:

*A diversity of sights appear to the “inward eye”. This is very distracting. I try, unsuccessfully I am sure, to take my “self” out of the building. I do this by playing a type of game. The game goes something like this: -

* The building is designing itself.

* Out of all the myriad forces shaping it, including financial, regulatory, aesthetic, contextual, technological, etc. what does the building want to become? Not “what do we want it to become”.

* I am asking the building what it wants to be?

* How will it form itself into an aesthetic entity whilst fulfilling all of these competing requirements? [mo]

In summary, the empirical data reveals that the designers participating in the study understand designing as heuristic, iterative and evolutionary. They describe the process as demanding particular ways of working in a space between the external physical world and the internal imagined world. Negotiating and navigating these worlds and the space in between involves different ways of thinking.

While induction is discussed in relation to drawing meaning out of information collected, imagining is regarded as crucial in creative mental synthesis. That is, in intuitively developing tentative ‘wholes’ of varying levels of abstraction as places for conjecture, simulation and modelling, varying degrees and types of immersion and
engagement by the designer and others are involved. Sometimes the engagement is conceptual; sometimes it is also emotive and aesthetic in the existential sense. Mental models and mental modelling are linked with facilitating incubation, gestation and distillation at a subconscious level; a process that is understood as highly original and creative. The following section describes the outcome of closer examination of imagining and the various ways this is employed by designers especially in relation to mental modelling and creative mental synthesis.

5.3 Empirically Grounded Categories of Imagining

As conveyed in Figure 5.1, the analysis of empirical data produced four categories of imagining: visual imagining (comprising spatial and pictorial imagining); aesthetic imagining; and (con)textural imagining.

Figure 5.1: Empirically grounded categories of imagining
5.3.1 Visual Imagining

Visual imagining “…allows you to see with the mind’s eye what has not yet been drawn” [an].

Pictorial – functional

Several designers discussed their experience of designing giving emphasis to possible ways in which the environment might operate, including how spaces might connect and interconnect to support certain activities. For them, imagining is a ‘cognitive plane’ where: “internal spaces are visualised and their interrelationship with other interior spaces is conceived in my mind” [mn] as a two dimensional (2D) or pictorial image such as a floor plan, wall elevation or section:

The ability to visualise a built form from a plan view develops over time. This especially applies when the plan and or section are complex. The ability to read architectural drawings is probably much more restricted than is generally recognised. I work on plan view mainly, but with the section in mind. When the section is the generator I work more in section [ja].

In this category, the translation into 3D is digital rather than cognitive:

One of the positives of CAD is the ability to generate a model at an early stage. Most of my design development and documentation is now done in CAD, working in 3D, where the model is the source of all views, including walk-throughs, fly-overs, etc [ja].

Similarly for another designer, various concrete elements are the starting point: “roof and wall envelope shape is the starting point, particulars, eg windows, doors, balustrades get added later” [kz]. Where images do have a 3D quality, these are mechanical, described as: “an image usually three dimensional i.e. photorealistic, sometimes more geometric, rather like an isometric drawing, sometimes a view from a long way away so as to imagine the overall form of the structure in two dimensions, like an elevation drawing” [bn].
In terms of the relationship between the designer and the ‘object’ of view, this can be static as when working mainly with plans and elevations; or dynamic where the 2D views represent different orientations between the designer and the object, or where the objects have been rotated in relation to the designer.

**Pictorial - emotive**

Sometimes these descriptions included reference to formal qualities and the possible finishes: “Visualisation (in the form of creating mental images) occurs in reviewing possible room layouts, external and internal form and material selections as part of the production of concept layout/s” [bn] suggesting the intent to convey a particular feel or mood.

**Spatial – functional**

As indicated in the previous section, several designers discussed their experience of designing giving emphasis to possible ways in which the environment might operate, including how spaces might connect and interconnect to support certain activities. For these designers, their relationship with the object was essentially two dimensional or pictorial. For others however, what is visualised has a three dimensional (3D) or spatial quality: Spatial elements are explored “to investigate the possibilities of the space, and develop relationships between the spaces. It can often be easier to visualise something in 3D than to try and draw it. It gets lost in the translation” [mk].

As indicated in the previous quotation, 3D visualisation is discussed in relation to the externalisation process of drawing and how this latter process on its own is less successful than first attempting to form a 3D image in the mind. In this respect, and as also conveyed in the following quotations, 3D imagining is a powerful translational strategy: “Without this [3D] imagination there would be no foundation for further design. Researching facts could be one way but the research always needs an imagination for it to be translated to a physical design” [wk]. “it is the driving force behind realisation of the brief. If you have no imagination then you cannot design and you cannot provide a solution for the client” [ck]. Added to this is the role of imagining in communication with the client:
I designed a house that is totally made of timber, totally contrary to what he said, just because the spot, it had to be attached to another Swiss chalet and knowing him, all he wanted or I thought he wanted was space and volume. So.....and I had the authority of a visible structure two talk at once columns and beams and all that have to be much bigger because of the snow than what they are here. And I saw that vision from the start, large timber columns, timber panel finishing with shadows drawn against these columns. Columns visible, structure is all visible and huge big windows which were the opposite to what he had before. And I had that in my mind when I talked to him about it before doing anything. He said, oh no I totally don’t want timber. Okay. I’ll show you and I did that, that’s when I went straight to computer drew the picture in 3D...and where the plumbing would be and he was convinced and the house was built like that.

I: And the picture that you imagined in your mind’s eye is the same as what came out on the computer?

[sg]: It’s exactly that.

While some designers appear to employ spatial imagining in a detached and static way, others are more involved and iteratively engaged. Here spatial imagining is not only used to see the space in the mind’s eye as an observer, but also allows the designer to “be in the space”, to experience it and test how things may work by “trying things out in your head, thinking about them” [br].

[so] I understand imagination to be an aspect of mind. (Not separate.) The thinking mind can know and learn many things but is easily overwhelmed with too much data. By taking time to “be” with the place, the brief and ponder opportunities and challenges inherent in the design situation, one gives one’s entire mind – conscious and sub-conscious – to mull over the plethora of issues present in the situation. One may then “intuit” a solution or a range of possible solutions, and “imagine” them – picture them in one’s mind or
transfer images to sketch paper and “test” them – try them on to see if they fit... This is all accomplished via imagery, which, before it is committed to paper of computer graphics, is first “imagined” in the mind of the architect [so].

In this category, the purpose of spatial imagining is very much functional and operational:

*The role of visualisation is to be able to see in your mind how the spaces and the requirements that go on in them, will work and to consider the effects of constraints and other aspects of the project, to minimise conflicts. It is also necessary to visualise the way in which a building will be physically constructed when creating spaces. No point in creating something that won’t be achievable [bl] ... I picture myself being the end user and using the spaces I am create [in order to] try to see better ways for processes and space relationships, etc., to increase efficiencies and eliminate crossovers [bl].*

While some designers conveyed somewhat simplistic notions of spatial imagining, others were more sophisticated, describing what is imagined as a: “complex overlayering of systems; circulation, habitation, structure, services and sometimes the picture is completed by colours of furnishings [dk].

Where there were references to how the spaces feel, these tended to relate to physical aspects of comfort: “I am within the rooms I am creating and how it may feel to be using those spaces” [jv]

*The building form, its layout, its circulation patterns, its spaces, its outlook, its potential for being well suited to good placement of furniture and objects and, finally, its appearance. This is not necessarily a complete list. Each factor tends strongly to affect the design of the others...The relationships of the floor levels of the proposed structure to one another and to the levels of the ground, along with other similar considerations, are often major factors in one’s mind when establishing principles of design that will be applicable to the specific project being considered [sd].
According to one of the designers, cognitive 3D modelling is refined by building actual models:

*Generally the first visual manifestation of a design occurs over a weekend, the only time when the phone stops and I have uninterrupted periods in which to think. I begin by drawing a large-scale isometric or axonometric projection, which evolves naturally as I resolve the most important spaces first. Detailed functional relationships sort themselves out through the process of drawing. Or else, more recently I am building balsa and cardboard models as the first full-blown expression of the idea. There is no freehand sketching in the accepted sense. ‘Big ideas’ evolve as fully-resolved entities and they rarely change in any dramatic way, unless the functions which underpin the project are revised [mn].*

For another designer:

*We place into the mixing pot the clients brief, our experiences of the site and its surrounds, thermal considerations and initial thoughts on massing. The butter paper comes out and a lot of sketching and model making occurs until the form starts to take shape. Once the form and plan has taken shape, we move to 3D CAD. The design is then developed in 3D CAD” [dw].*

While most descriptions placed the designer alone in the imagined spaces, in some instances designers also imagined the clients and others in the spaces undertaking particular activities:

*Imagining, undertaking activities, often happens with spaces such as kitchens, particularly imagining moving and undertaking activities within or to/from the space, ie. Imagining the suitability of the relationship between several spaces such as kitchen and pantry, or getting something from the fridge, or kitchen and adjacent living space, in which case imagining communicating with guests often occurs [bn].*
Spatial – experiential

As described and illustrated in the previous section, some designers employed spatial imagining in a very functional way, conceptually and substantively. There were other instances however, where the engagement with the imagined spaces extended beyond the functional and where images were understood to facilitate deeper engagement for and with the client; for explaining as well as understanding: “Absolutely important always draw the perspectives- as then I can “see” and the client can see, very few clients can read plans the one that do are engineers or work with plans” [hk]. “A picture says a thousand words. We encourage clients to provide images of works that they like and don’t like. This helps to quickly identify a direction of design” [wl]. “From the massing of the design through to the material textures that may be engaged. Whether it is sketched elevations, perspectives, models or 3D CAD, the visual is an important part of understanding and explaining the building” [dw]. Without imagining and “the ability to 3-dimensionally picture an environment and put yourself in the “experience” of it, you cannot fully appreciate what the design solution is” [dn].

One of the consequences of failing to acknowledge an experiential role for imagining may be that the space will end up lacking certain experiential qualities. For “Without imagination it would not be possible to produce a solution that meets the clients brief while producing spaces and buildings that are aesthetically pleasing while enhancing the users experience” [bb].

Unlike in the previous category where the designers were at times detached (even outside the space, such as when viewing the layout of a building from above), in this category the designers invariably are immersed in the space or imagining others there. In this regard, the space becomes a place:

[fx]: it’s the way I have to do it, is actually engaging with those people and it’s because of the way I am, it’s just this kind of trying to understand other people and trying to establish a relationship with them and really, really trying to understand who they are. So I’m always placing them, placing them in that. I’m imagining their activities in it. I’m imagining they’re in it, not necessarily just me.
I’m kind of trying to understand the essence of them and shape these places around them as well so it’s all that whole process of kind of pulling all of those things together”.

If the designers are designing a building their immersion in the environment can be outside as well as inside the building: “I am always in the space! The every level is always as could be really seen from a road, or a yard- nothing else is important” [hk]. In all, the designer’s relationship with the building is very dynamic: “I also like to see the building as you might from, oddly enough, a helicopter. I often do many sketched aerial views which show the building almost as a sculpture in the street but seen from above” [mo]. For another designer, they describe: “Walking around it, flying over it, and through it; trying to be there and experience it firsthand” [pt]. For another:

I am everywhere I need to be. If attempting to appreciate the way a stair meets an upper level landing I may be in mid air beside the subject point say 3 or 400 mm off the stair slightly above or beside. If investigating the meeting of several floor treatments, it may be from directly above and may have an element of zoom. If a complete building it may be from all around including aerially but unlikely underground. Few digital tools have achieved this capability. SketchUp goes some way toward it. ViewBuild is closer in that if applying for example a decorative element you can zoom down through walls and up to the ceiling corner it may be placed. That is very much the way we visualise.

Visualisation (mentally) is vastly more powerful than current tools achieve. Instantaneously you can invest the image with the mien of last night’s theatre, a childhood dreaded place or the lofty daydream of a walk among the high eucalypts of early morning [ja].

The dynamic quality of this relationship is particularly evident in the following response:

I imagine myself observing and moving through at many different points of the entire building being created. The Architect must be
able to walk through the entire building from the human perspective eye height, but simultaneously be able to view from bird’s eye in the sky and at all “visual approaches” to and from the building. This allows full understanding of the dynamic interactive sculpture being created. I also imagine turning the building around in my mind to view different angles at will from my one view point (a bit like rotating a model in your hands) [gg].

The imagined experience for these designers is also sensorially rich:

...I always try to imagine how will it feels being in the space that I design, how I will move, how I will interact with other users, how big is the space, how the light will enter... [og].

...touching, tasting and smelling etc. Using the senses as much as possible [bk]

[cw]: Yeah you can see colours, you can... it’s quite eerie because it’s a bit spooky I guess but you do walk through it and um... colours and lights on a spatial sense is usually a little bit warped, but yeah you do.

I: Do you feel temperature or light and dark?

[cw]: Light and dark, yeah. Breeze, even things like... not breeze but openness, a sense of openness, there’s a sense of that, yeah. You get that feeling walk into a room that has an open side you get a sense of that, you get that... you know? Or the, or if a place is um, more condensed, it’s condensed down and you get a sense of that enclosure.

To further contextualise and enrich the experience, designers visit and experience the site:

The outcome develops as you find out what the requirements are and it changes as the requirements are refined. With a house site, I generally walk onto a site and imagine the location of spaces that are
usually predetermined by orientation, breezes, views, access, neighbours, inlook, outlook, etc., - all fairly instinctive [bl].

For some designers, this experiential form of imaging can be so powerful as to inform the design and construction of environments that, when experienced by the designers, feel very familiar:

[hc]: That’s how I always say....it’s umm....I am constantly surprised at how similar they are...I don’t get a feeling of newness when I walk in it...truthfully, if you do it well, it shouldn’t be a surprise, if you have walked through it already.

For others, the outcome may have similarities but has evolved further due to other influences: “What I imagine at the beginning of a project and how it turns out in the end are usually very different. Some aspects may remain the same but usually the design has progressed so much from where I started that it is nowhere near what I imagined (usually it’s much better)” [gd]. Other respondents feel as though the end outcome is “Better, fully fleshed in all views” [md].

5.3.2 Aesthetic Imagining

“Without imagination it would not be possible to produce a solution that meets the clients brief while producing spaces and buildings that are aesthetically pleasing while enhancing the users experience” [an].

While this category has qualities in common with the previous categories, it also has several elements that differentiate it from the other categories. For experiences exhibiting aesthetic imagining there is recognition of a strong affective relationship with the design project from the start: “you need to be in this space in your mind, you need to clear your mind of all other matters and devote your emotion to the project to get there, otherwise you are just making buildings [jt]. For another designer this involves creating: “an emotional theme for a project in my mind and recall, through my experiences or research new experiences, all the conceptual spaces, forms colours and finishes that equate to that emotion. This then becomes
the visualization to target. I don't get it right every time first time” [pt]. For another, the process is also described emotively:

The first part of the process is to “feel into” what the project is about. Without the “feel into” process the design is about "due process” which is quite different idiom. From the "feel into" process, the imaginative juices start working through a range of internalised journeys that "make a fit" between the form, the physical requirements of the brief, and a manifestation of the two [tk].

The emotive dimension also extends to the client: “[I] talk with clients – what accommodation do they want (distinct from what accommodation they need) – how do they live their lives, who cooks, entertain, family life, music, travel, food, drink, art preferences. I want to create a special glove that will embrace their lifestyle” [ig].

In terms of the relationship between the designer and the ‘object’ of the evolving design, this is very fluid, sometimes to the point where: “I am the object. There is a oneness between the Observer and the Object” [tk]. Or as noted by another designer: “By closing one’s eyes and living the building...we try to experience the spaces and use this to communicate the possible experiences to the client” [dw].

The process is also understood in metaphoric and abstract terms: “Far too abstract to make this a place….. I think it is really a swirl of emotion and feeling, like colours half mixed together in a pot, and of course the challenge of architecture is to get this and make it into a built form” [jt]. For some designers, the initial inspiration comes from the site:

Sometimes you can just see the building on the site. It depends on how you approach the site in the beginning; what time of the day can influence the design process. If you go in the morning sunlight may be flooding the site giving you warmth that you want to capture. It may be a view, or the lack of privacy. It is more like capturing a feeling, the essence of what the site says to you that you try to capture in the design [wl].
Also of note in this category is the experiential engagement of the designer, and in some cases, engaging the client experientially:

*I tend to work kinaesthetically and to feel spaces, especially as they are animated by light, season and time of day. With clients it is often necessary to engage an understanding of size and to set out a space at life size as for instance by pegging out kitchen benchtops and fittings. When the project is an extension or conversion, lines of string may be used to model the proposals at 1:1”* [dk].

In addition, designers use imagining as part of a rigorous process of imaging, representing and testing:

“*I test it and tune it. This allows you to assess its capacity to engage. Light and sound is probably much more likely than actual temperature except temperature as it may be perceived due to the character of the space”* [ja].

Another differentiating aspect is how designers regard each project as unique: “*Every project is different...[in] my mind’s eye as you say [I am] focussed on the qualities that I am looking for in this project, be it bold, sympathetic, adventurous, or whatever”* [pt]; and the experiential relationship is intimate and all consuming:

...the little house we did in Canberra, which was the very first project that we ever got on site, took a bit longer than that to finish, was one of those projects where it wasn’t at all about form, it was primarily about space and materials and and...and...light. And it was one of those projects where, and because it was for the family, and I was very sort of intimately connected with it, I really...it was for my father and his partner and I wanted it to be magnificent and that was...and even though they didn’t necessarily have this objective of magnificence, they really sort of wanted to take a north eastern corner and carve out a laundry and a toilet and make it useable. I really, you know, you feel like you owe your parents a lot and you do. I really wanted to make this thing that was just a delight for them
because they’re delightful people, they love to read and drink wine in the afternoon and have great lunches and so on... Yeah and I knew that they would really enjoy this if I could just make it right, so I spent a lot of time considering what the materials were and how it would orient it towards Mt Andrew which is over there and how the sun would come across at different times of the year. And I could do a lot of banal kind of testing of that in computers and relations but a lot of it was really about just, really just placing yourself there and imagining. Recycled timber, what it feels like and how the glass feels when it’s really cold outside and it’s warm inside and things like that. And having, and gone there and seen it finished it’s just....it’s, you walk in to the space and there’s just no surprises. You kind of, you’ve already been there and it’s just taken time to just sort of come into existence.

5.3.3 (Con)textural Imagining

Whereas the designer (and in some instances the client and users) occupy a poetic place in aesthetic imagining, for (con)textural imagining the place or space is a literary one occupied to better understand and develop a pragmatic context for guiding later more abstract and conceptual stages: “the pragmatic stage of reading and understanding the brief [is] first. Then there is some period of contemplation, arranging the spaces in my mind, developing a model concept” [pt]. Similarly for another designer they: “gather available information, identify constraints and opportunities; develop a conceptual framework for design; thumbnail sketches progress to schematic design, with the form constantly reviewed and reinterpreted in order to strengthening the communication of the concept” [ph]. For one designer, a direct reference is made to the need to collect data: “I am aware of the need to collect and analyse data. This deliberately avoids any pre-conceived ideas and is communicated to clients. i.e. let me have a look at what you say you want in your brief, and let me have a look at the site or the existing building etc., and then we will see what comes out of this” [bn].
This category of imagining then is regarded as particularly critical in the initial brief development and design development stages. According to one designer, the process starts with asking: “What is the question that the design process has to solve? There are too many correct answers to the wrong question. We spend too little time on defining the issues and instead start designing around preconceived concepts” [wb]. “[T]he process of design at these stages should incorporate developing an understanding of the client’s needs and wants, as well as an understanding of the possibilities of the site and the immediate environment” [mk].

In later stages, the designer may adopt various roles to challenge proposals:

...you are trying to refrain from imposing the solution prematurely but you need to be able to place yourself within the overall context of the problem in order to form views of what the issues are and make sense of the project. You need for example at various times to “be” the client, the local authority town planner, the lending authority, the potential buyer, the builder, the tradesman, the neighbour, etc. Your imagination is what allows you to do this [mo].

Overall, understanding the context and applying contextual elements in a process of textual imagining is regarded as critical to the design process:

As previously mentioned there is a need to appreciate and assimilate the brief and the myriad constraints relevant to the design problem and to understand the immediate and wider context including economic, social, regulatory and physical factors. As the preliminary designs emerge from these forces they are evaluated and redesigned. This redesign almost invariably involves a re-evaluation of the brief, the design constraints and the context. This circular process is repeated many, many times until the desired design emerges. In the case of a building the process of design, evaluation, re-evaluation and redesign goes on until the last worker leaves the site [mo].

In summary, this section outlines four categories of imagining emerging from analysis of the empirical data comprising designers’ experiences of designing and imagining. These are labelled as: visual imagining (comprising spatial and pictorial
imagining); aesthetic imagining; and (con)textural imagining. As the following section illustrates, undertaking imagining in the context of mental modelling demands a particular relationship between the designer and the physical environment in which they are located at that time.

5.4 Factors Influencing Imagining

For many designers, designing demands mental and sometimes physical withdrawal from their physical world:

You need to zone out and concentrate on the imagination of your mind to fully experience the developing concept. There are too many interruptions in the work environment to not require this to happen [pt]

Many of the designers interviewed regarded various elements in the environment as being a distraction, and subsequently a negative influence to imagining:

I do not like working in open plan offices where there are many distractions to concentration. I like to work in a cloistered environment like a monk [to be able to focus]. This approach is then informed and enriched by having group [team] discussion for review and design [wb].

...very conscious and cannot begin initially at least (ie the very beginning) with any possibility of interruptions [lo].

As indicated here and in the following statement, several talked about removing themselves from the source of the distraction: “If I have a particularly challenging concept to resolve, I withdraw to a quiet room. I am still aware of my surroundings though” [bl]. Not only is the physical space important, but “Getting away gives the time for inspiration” [br]

For some designers, they are so focussed they become unaware of their surroundings, even to the point of describing their detachment from reality as an ‘out of body experience’:
When deep in the initial concept design phase, this can be a bit of an “out of body experience” as this is thrashing deeply through environments etc. in a very fluid manner. I am more aware of the physical environment when in later, more practically fashioned design stages [gg].

As also conveyed here, this is not so much the case when dealing with more pragmatic aspects of design:

...(so) focused on the process that I don’t hear what is happening around me. This can happen when I’m drawing or imagining a design. However if I’m trying to read, say regulations I can struggle with the task if the surrounding environment is noisy [wl].

Some describe a parallel state of being:

Others have often noted that I seem totally absorbed at these times. I recognise a heightened focus but would argue that I seldom miss whatever else may be going on around in my immediate environment and do attempt to keep up-to-date with wider situation [ja].

The place in which I am located becomes the background of existence. The sounds and smells are there but I am focusing in my own mind on the visualisation of the task at hand [dw].

Designers vary in their ability to detach themselves:

...always conscious of [the surrounding environment], the interaction of people and spaces and their usage [fw].

At times my environment becomes very intrusive, causing me loss of focus and difficulty with imagination, ideas and visualisation [rn].
I am able to “transport” myself to the design situation and that environment. However removal of distractions and interruptions allow greater freedom and flow of ideas. I prefer a natural environment for greater creativity and have refreshed thinking in or after such renewal [jn].

For those who can create an imagined world, their time there is not necessarily spent doing concentrated work as noted in the following response:

...you become more involved in your sketching, I mean it’s more a sort of acknowledgement of them, becomes a subconscious type acknowledgement because you’re devoting a lot of attention to your sketching or I mean even CAD, it’s really just doodling, so it’s not that massive concentration type effort and you’re really just doodling and thinking well, put this and put that, doodling with no specific something in mind [eo]

The need to move awareness back to the physical world is precipitated by the need to externalise the imagined idea:

The in process becomes all-engaging - the external environment becomes non-existent, not important, secondary perhaps even tertiary to the inner experience. It is only when the conceptualisation crystallises and the need to externalise the process does the surrounding environment re-engage [tk]

However, as revealed in the following response, it is possible for a mental state and imagining to be mediated by some aspect of the physical world. Indeed, it appears that the physical process of sketching and what is produced on paper partners with a mental space to form dual spaces for mental engagement:

I will lose awareness of time and my physical surroundings. Music will cease without me being aware and I am aware often only of my mental state and the process between my mind and the paper” [ig].
It appears that when in this mental world, another aspect of the designer’s being takes over: “in the ‘zone’” – so to speak...my subconscious needs time to put things into place” [so].

As indicated here, and as follows, the space or spaces created have a different temporal quality:

At the point of designing I am completely transcended into a different time and space and oblivious of what is happening around me” [bv].

Designers also describe the need to prepare their mind for imaginative work by engaging in some other activity even another project:

If it is difficult to focus, it is usually best to do something else: play some music, walk, eat, rest, read, work on another project for a while....when your mind is ready you know and can get back to productive work [so].

5.5 Conclusion

The findings of this chapter reveal the complex process of imagining and its characteristics. Furthermore, it also reveals that imagining does not begin in a state of ‘tabula rasa’, or a vacuum, but rather, a designer’s evolving understanding of a design situation begins with preconceived aesthetic values, precedents, previous projects and assumptions. It is an interpretative and iterative process that is underlined by an anticipatory projection of meaning.

This chapter presented the outcome of analysis of empirical data obtained from the participants of the study when describing their experiences of designing and imagining in relation to their practice in architecture or interior design. The first section sets the scene by describing how the designers regard designing and, related to this, the phenomenon of imagining. The second section represents the outcome of a closer scrutiny of imagining and the development of empirically grounded categories of imagining. The third section provides an outline of what designers
consider to be the main enablers of, and barriers to, imagining. When considered in the following chapter in relation to extant design methodology and presence theory, a theoretical foundation is established for speculating about a new theory of imagining in spatial designing in the form of the Spatial Design Imagining (SDI) Model.
CHAPTER 6: THE SPATIAL DESIGN IMAGINING (SDI) MODEL

6.1 Introduction

This chapter focusses on the main outcome of the study – the Spatial Design Imagining (SDI) Model. It outlines the development of the model according to the integration of extant theory from design methodology (Chapter 2), the empirically grounded categories of imagining emerging from the research involving design practitioners (Chapter 5), and extant theory from presence research (Chapter 3). The following diagram (Figure 6.1) illustrates the general relationship of the three areas and the connecting role of imagining. It also emphasises the spatial design context as the primary domain and focus for this study. As conveyed in Figure 6.1, the research on presence enables closer examination of imagining, and complements and extends empirical research specifically concerned with imagining as experienced by design practitioners. When considered in relation to existing research on design methodology, the outcome is a enriched understanding of the role of imagining in design and a fertile base for more effectively informing design education, particularly in architecture and interior design.

Figure 6.1: Conceptual framework for enriching knowledge of imagining in design
6.2 Imagining and design methodology research

The overview of literature on design methodology presented in Chapter 2 highlights a connection between imagining, design thinking and cognition, and design process (Figure 6.2). The design context is now generally understood as complex, ill-defined and uncertain, and in some respects, ‘wicked’. Designers work ‘in the now’ for projects to be realised in the future. While some projects may be very similar, all projects are unique and novel. Given these qualities of the design context, design process by necessity is heuristic, iterative and satisficing. As noted in Chapter 2, Cross (2001a) draws a direct link between working in novel situations with incomplete information and the need to use imagination and constructive fore-

Figure 6.2: Contextual mapping of imagining in design methodology literature.

thought in a heuristic way. This realisation led to greater focus in research on design thinking and cognition and thus to an understanding of it being productive and generative, involving conjecture and propositional thinking. This led to further
understanding of the central role played by abductive thinking, as opposed to
deductive and inductive thinking. According to March (1984), abduction, sometimes
also referred to as production and relying in part on intuition, is the only operation
which facilitates the development of new ideas; in other words, the process of
creation.

What this actually involves invites closer examination of the several interconnected
concepts highlighted (and sometimes used interchangeably) in design methodology
research; concepts such as: imaging, visualisation, mental imaging, mental models,
simulation, imagination, and creative mental synthesis. In this study, imaging is
accepted to mean the forming of a mental picture of part of the world. By
association, these concepts are invariably understood to be visual (as opposed to
descriptive) and generated by a process of visualisation or visual thinking. To
differentiate them from externalised images, they are also referred to as mental
images and the process as mental imaging.

Early research by Arnheim (1969) provided additional information regarding the
nature of the mental image. While mental images are visual, not all are pictures.
Images can be pictures, signs or symbols with mental picture images having a low
level of abstraction compared to signs or symbols with the latter providing for more
unusual transformations. Researchers such as Singh (1999) also propose that mental
imaging is far superior in terms of flexibility and speed to sketching or physical
modelling. For various researchers such as Damaio (1999) and Hoffman (1998),
visual images are built on visual experiences which designers draw on in creating a
novel response to a design problem. This connects with previous work by Piaget
(1971) who asserts that mental imagery develops perceptually through action and is
further developed through imitation as in the act of drawing. For Piaget (1971),
images can be static, or kinetic in the sense of being able to rotate or move.
Additionally, their qualities can change shape or form and, as such, be
transformational.

Research suggests that when designers use sketching in the development of ideas,
they are working between two modes of mental representation – propositional
(largely symbolic) and analogue (quasipictorial, spatially depictive) (Fish and
Scrivener, 1990). For these researchers, imagination is understood to play a central
role in facilitating processes of generation, manipulation, combination and inspection. The images produced are then used by designers for various purposes ranging from functional to perceptual, speculation and testing; in other words, mental simulation. On this note, research and autobiographies such as that by Frank Lloyd Wright suggest caution in committing mental images too soon to paper, advocating instead for the conception of the building to live in the imagination and develop some robustness before it is externalised and subjected to external manipulation through such action as sketching.

Mental simulation is considered necessary in designing in order to reduce uncertainty and increase predictive and explanatory power. Mental models help predict through inference how something may function or behave even when the designer has had no previous experience of the situation. While mental models and mental simulation are entirely subjective and imprecise, they have been found to be an effective strategy when working in highly qualitative, indeterminant situations. For Lawson (1980), imagining is integral to mental simulation enabling the designer to draw from their own experience and combine material without any definable (at that time) endpoint in mind.

In this respect, then, designing involves co-evolution of the problem space and the solution space (Maher et al., 1996). Identification of a key concept or ‘frame’ proceeding to abductive sensemaking are central to this creative synthesising process (Dorst, 2004; Paton & Dorst, 2011). Informing the process is the use of metaphor and analogy, contextual engagement or immersion, and conjecture (Paton & Dorst, 2011).

### 6.3 Imagining and empirically grounded categories

This section reviews the chapter on empirically grounded categories (Chapter 5) and explores its relationship to imagining as conceptualised in the design methodology literature reviewed in Chapter 2 and summarised in the previous section. As the discussion reveals, the findings of the empirical study provide additional knowledge about the nature of mental imaging and its relationship to imagining.

Figure 6.3 represents the imagining taxonomy as first presented in Chapter 5. As illustrated, it incorporates three primary categories of imagining - visual imagining,
aesthetic imagining and (con)textual imagining, and the two secondary categories of imagining – spatial imagining and pictorial imagining.

![Taxonomy of imagining from empirical data](image)

Figure 6.3: Taxonomy of imagining from empirical data

In the context of the empirical study informing this taxonomy, visual mental imagining can be pictorial (essentially two dimensional), or spatial (exhibiting more three dimensional realistic qualities). From the designers’ experiences it appears that pictorial imagining (such as floor plans or sections) restricts simulation to functional and perceptual aspects, while spatial imagining enables imagined active bodily immersion at a deeper experiential level in the environment being created. In addition to their own experiences, spatial imagining also invites the designer to imagine how others might experience the environment; how it might support psychosocial as well as perceptual, physiological and practical needs.

In many cases, the designer augments mental models with externalised models in the form of two-dimensional and three-dimensional drawing and sketching. Increasingly, designers use digitally mediated three-dimensional drawings to aid representation, imagining and testing, with many integrating external physical models (drawings or
actual three-dimensional models) with mental models. As noted in the design methodology literature, these models have varying degrees of abstraction ranging from propositional (largely symbolic) and analogue (quasipictorial, spatially depictive) (Fish and Scrivener, 1990).

The designers’ relationships with mental models or elements of these models also vary with some being quite fixed or static, and others highly dynamic and kinetic. As earlier described by Piaget (1971), these designers imagined objects of their focus rotating, or their body and viewpoint changing in relation to the object of focus. Through imagination, aided in some cases by digital software, existing forms, shapes and qualities also could be transformed. In addition, designers’ responses highlighted various roles for episodic knowledge (direct and vicarious) and contextual knowledge including as sources of inspiration for idea formation through to the constraints and criteria for evaluating successive hypotheses or conjectures.

For some designers, there was heavy reliance on, as well as a strong belief that contextual knowledge such as site conditions, economics and client requirements should be the primary generators of the design. Imagining in this case in the initial stages tended to be textual and descriptive rather than pictorial or spatial. In contrast, other designers opted for a less pragmatic, more aesthetic approach in the initial stages.

For those designers, adopting an aesthetic approach meant starting with an emotive theme. Here we see alignment with the concept of the ‘frame’ proposed by Dorst (2004) and Paton and Dorst (2011). The emotive theme is highly metaphoric and analogous with the quality of the experience planned for in relation to the building or environment. It also informs, and indeed demands, aesthetic contextual engagement with the site, with the clients, and with the environment as it forms, or more precisely, as it is allowed to form itself.

The data collected from the designers used to inform the categories of imagining just described also included comments about various factors influencing their ability to imagine, particularly in the early stages of the design project. While designers varied in their need and/or ability to manage their environment in order to facilitate imagining, several designers identified the need to minimise interruptions and other
distractions by withdrawing to a more quiet physical environment, or even to a natural environment. There was also mention of the need to prepare oneself for the process of imagining by playing music, or going for a walk. The importance of making time for the imagining process was noted, recognising that in many respects this could not be determined or prescribed. Once ‘in the zone’ it was considered important to allow the subconscious to take over. One designer described being ‘in the zone’ as an ‘out of body experience’ involving transportation to, and an immersion in, the design situation. Some designers describe how they occupy this world in addition to the physical world; in other words, they experience a parallel state of being. This was especially evident when talking about the role of sketching and how it supports the imagined space between the paper and the brain, and associated creative and productive thinking. While some designers are perceptually aware of the physical world beyond the paper, others describe a selective awareness of the paper only. Once an idea crystallises, designers recognise the need to engage more consciously with the external world. This aligns with Folkmann’s (2010) notion of focussing and defocussing.

6.4 Imagining and presence research

As highlighted in Chapter 3, presence is regarded as a basic human experience encompassing everything from subconscious physiological responses through to higher-level cognitive, and even emotional and bodily awareness, an includes actual physical and social interaction. This rather broad context is encapsulated in Chapter 3 as a framework comprising three main categories: non-mediated presence; mediated presence; technology-mediated presence. Informed by Lombard and Jones (2007), presence experienced when in objective proximity to another person or object is classified as non-mediated physical presence. Presence which is generated via a non-technological external element such as a book or an internally generated mental model is labelled as mediated presence, and technology mediated presence is brought about only through digital technology means. In terms of the latter two states, mediated presence enables a person to perceive themselves to be somewhere other than in the physical world. In the case of technology mediated presence, this is the sense of being in a computer-generated or computer-mediated environment, such as CAVEs or VEs. Maximum presence is understood to exist when the environment
is able to support the full intent of the user and when the medium facilitating the imagined or virtual environment is experienced as invisible or transparent.

As previously noted, in design practice there is increasing reliance on digital and virtual technology for the purpose of visualising, simulating and documenting yet to be constructed environments or objects. However, despite significant innovation in digital technology (such as in entertainment or gaming), the use of digital and virtual software by spatial designers in the early stages of design is generally restricted to digital 2D and 3D models of building and interiors, their manipulation and/or movement around and through such spaces.

As noted in Chapter 5, which focuses on designers’ experience of designing and imagining in designing, while the designers made reference to this software, they also described experiences of imagining in other ways; in non-technology mediated ways. In presence research, non-technology mediated presence is used to describe human experience in traditionally non-immersive and non-interactive environments such as that elicited through reading books, dreaming or daydreaming. Given the emphasis by the designers on non-technology mediated imagining, the research in design methodology that emphasises the significance of mental modelling, and the research on presence that suggests a stronger connection between presence and non-technology mediated presence, this section will explore possible connections between imagining and presence by focussing on non-technology mediated presence. The following section will then bring together the discussion in this and previous two sections to propose a spatial design imagining (SDI) model.

In terms of non-technology mediated presence, this can have a personal dimension (such as perceiving self or part of self in the context of what is imagined, such as in a daydream). If reading a book, a person may perceive themself to be either ‘within’ the story as a character, or themself to be in parts of the story. When watching a film a person may also perceive themself to be in the scene as one of the characters, thus feeling and responding with the same emotions or reactions as the actor/s. This form of spatial presence or ‘sense of being there’ is also referred to in terms of ‘physical presence’, ‘a sense of physical space’, ‘perceptual immersion’, and ‘transportation’, and may have associated with it a social presence involving the perceived existence of others.
If presence in this sense is regarded as an experience of being somewhere other than in the present physical environment, what facilitates this? Is it the medium alone? Is it something external and perceptual, or internal and conceptualised?

As noted previously, Schubert and Crusius (2002) assert that presence is not a direct result of immersion, but is “mediated by cognitive representations that are constructed on the basis of immersive stimuli” and that it is the “structure of this mental model [that] determines whether the user experiences a sense of presence or not” (Schubert & Crusius, 2002, p. 1). Further to this, they acknowledge cognition as a mediator between immersion and presence. This then begs the question of a possible role of imagining, or as termed in presence literature, imagination.

In expanding on the notion of degrees of absorption in a text, Ryan (2001) identifies one type as ‘imaginative involvement’, where the reader adopts a “split subject attitude” and “transports herself into the textual world but remains able to contemplate it with aesthetic or epistemological detachment” (Ryan, 2001, p. 10.). Another degree is ‘entrancement’, described as total immersion where the reader is caught up in the textual world so that the surrounding world fades away and the reader feels as though they are taken to the ‘world in the story’. Ryan (2001) also refers to addiction, which is the attitude and the willingness of the reader to escape from reality and be so immersed in the textual or narrative world that they feel able or compelled to interfere with it. When in this state, Ryan (2001) asserts that the individual is most likely to experience spatial, temporal and emotion immersion; transportation to the geography of the narrated world; engagement with the unfolding events of the story; and identification with the characters portrayed.

From the discussion presented in the previous chapters, parallels can be drawn with Ryan’s descriptors of degrees of absorption in text with imagining in design. In fact, these cannot be considered discrete concepts, but rather, are similar and integrated notions. For example, it appears from the research presented thus far, designers by the very nature of the context of their creative practice have to adopt a ‘split subject attitude’, with one dimension facilitating existential engagement, and the other an epistemological and aesthetic detachment facilitating interference with the world; a world where they are both occupant and creator. This suggests that conceptually, certain design activities resemble a strong similarity to presence proposed by
Gysbers et al. (2004) that spatial presence so integral to this is facilitated by “higher-order mental activities such as cognitive involvement and imagination” (Gysbers et al., 2004, p. 13).

The discussion in this section has emphasised an internal/conceptual view of presence in an attempt to highlight salient aspects of the relationship between presence and imagining. Likewise the attention now shifts to Biocca’s (2003) ‘three pole model’ and its focus on the role of mental imagery space. According to Biocca (2003), and as described in detail in Chapter 3, the original ‘two pole model’ of presence only considers virtual and physical spaces, but not imaginary spaces. In contrast, the ‘three pole model’ allows for the role of mental imagery space. For Biocca (2003), a sense of presence can occur when individuals have the impression that they have ‘withdrawn’ from physical space into a purely imagined or as he describes it ‘imaginal’ space. This experience happens when the individual withdraws ‘focal attention’ from incoming sensory cues, and instead chooses to attend to ‘internally generated mental imagery’. This is highlighted in the previous section where designers describe how they facilitate this by withdrawing to a quiet place or a place where there are minimal distractions.

Sensory stimulus is also discussed in presence research in terms of the relationship between presence and imagining. As noted previously, in relation to spatial imagination, Wirth et al. (2007) propose that “spatial imagination becomes more relevant if the mediated representation of the space is less intuitive and more fragmented (e.g., when reading textual descriptions)” (Wirth et al., 2007, p. 502) and this aligns with Wallach et al. (2010), who argue that imagination does not have a significant impact on presence in sensory-rich environments. Jacobson (2002) suggests that imagery abilities may play a role when sensorial cues are less available, and they can, to some extent, stand in for the missing perceptual information (Jacobson, 2002). This is the case with reading books, or as we have noted, with designers in the early stages of designing when information is highly fragmented and vague. Despite the absence of any immediate perceptual stimulation, the designer is able, like the reader (Green, Brock & Kaufman, 2004) to experience a high degree of immersion or a form of presence.
In general, imagination (or in the same sense imagining) involving mental simulation, memory and embodied cognition, is understood by many presence researchers as fundamental to the experience of presence.

6.5 The Spatial Design Imagining model

The previous sections have each focussed on imagining in a particular context: first as described in design methodology literature; second, in terms of what emerged from the empirical study conducted as part of this thesis; and last, as revealed through an exploration of presence research. In this section, these different, albeit complementary, viewpoints are merged to advance a more comprehensive model of imagining of particular relevance to spatial designers and design educators. Figure 6.4 represents the Spatial Design Imagining (SDI) model as presented below.
Figure 6.4: The Spatial Design Imagining (SDI) model
As highlighted in the overview of design methodology research, the design context is now widely understood as complex, ill-defined, and uncertain. In this regard, all design projects are unique and novel, demanding a heuristic, iterative and satisficing approach. For design educators these qualities pose specific challenges. How, for example, does a design educator support and facilitate student learning for such dynamic and unknowable contexts? The general response has been to engage students in design projects (sometimes real, sometimes hypothetical) with ‘expert’ tutors who provide feedback informing further action and refinement. Over a period of time and involvement in a variety of projects of varying complexity and typology, students develop a repertoire of design skills and knowledge that enables them to produce ‘satisficing’ outcomes as judged appropriate in the educational context. How they do this remains largely a mystery for it is only when students externalise their thoughts that a response can be actioned. In the main, the design educators involved in designing and implementing design curricula particularly for design studio learning do so with only tacit understanding of how the students cognitively, affectively and experientially develop their ideas. Indeed, even the students are largely unaware of what they are doing and what is at play especially in the early stages of concept and schematic development. While recent industrial design biased research provides further insight into design thinking this is not informing design education particularly the spatial design areas of architecture and interior design.

We now know for example the major role played by abductive thinking in designing as part of a process that is productive and generative; in other words, creative. We are aware of attempts to further understand this through concepts like imaging, visualisation, mental imaging, imagination, and the like. While these concepts continue to be used interchangeably with no clear definition and thus creating confusion, what is emerging from this study is a growing recognition of the role of what this thesis calls imagining.

What is imagining?

As conveyed diagrammatically in the SDI Model (Figure 6.4), in the context of spatial design by experienced designers, imagining has the following features:

- Synthesis
- Orientation to the future demanding conjecture and simulation, also referred to as modelling
- Simulation that involves imagined transportation to, immersion in, contextual engagement and intervention with the modelled environment.

In the early stages of designing, imagining involves a process of construction, deconstruction, reconstruction, or, as described here, synthesis where an abstract assemblage or aesthetic mental model is generated as a higher order construct or ‘frame’ for additional more micro level modelling. The process can extend from daydreaming and fantasising through to abductive and speculative thinking. The assemblage can be an idea, concept or theme that, while not totally defined, possesses as part of its metaphoric quality a sense of wholeness enabling it to bridge the problem space and the solution space. In these early stages such a process is internal; that is, the generative process is internalised both consciously and subconsciously. Whilst what is imagined may have visual qualities, in some cases it may be a feeling or a textural concept like ‘transition’, or an experience encompassing several of these qualities. In this thesis, visualisation, involving an image produced mentally and seen ‘in the mind’s eye’ such as a symbol or a representation of perceived reality, is referred to as mental imaging. Imagining can involve mental imaging. However, in the generation of an aesthetic mental model that is more defined and represents a future environment it becomes multidimensional; it becomes a ‘place’ exhibiting affective, existential and temporal qualities as well as physical qualities; a place the designer and others can inhabit and experience.

For spatial designers, the process of imagining these ‘wholes’, (the process of synthesis) is oriented to the future, to a yet to be constructed and experienced building and/or interior environment. It is in this sense creative synthesis. Imagining for this purpose involves speculation and conjecture about what the artefact could be and how it could/should perform and be experienced. The process is heuristic with the designer repeatedly moving between ‘parts’ and ‘wholes’. It is also iterative with ideas thrown out or reworked; a deconstructive and reconstructive process.
The mental models referred to earlier are integral to this creative synthesis process. They provide opportunities and ‘spaces’ and ‘places’ for simulation and testing. As can be seen from the designers’ responses, they have different types of relationships with these models ranging from detached, static relationships to immersive, engaged relationships involving others or the designer alone. In this study, these models are proposed to comprise the primary categories of (con)textual imagining, visual imagining and aesthetic imagining. Further to this, visual imagining can be pictorial or spatial constituting secondary categories. Deeper analysis of these categories of imagining suggests a relationship between the type of model and the type of simulation. For example, pictorial imagining involving floor plans and elevations appears to restrict simulation to functional and perceptual purposes, while spatial imagining invites and supports imagined bodily immersion at a deeper experiential level.

Depending on the project, stage of designing and/or imagining ability, designers supplement mental models and imagining with external models. These can range from simple hand drawn sketches to sophisticated virtual spaces generated digitally. Substantively and procedurally, designers draw on various types of knowledge, some of which is developed directly from their experiences as well as from research of the context. This includes the experiences of their clients, some of which is vicarious and empathetically imagined.

As described in Chapter 5, the designer’s relationship with internal or external models varies. For some, the relationship is detached; for others it is highly engaging, producing a more intense sense of presence. In terms of the latter, this involves imagined transportation to, immersion in, and contextual engagement and intervention with the modelled environment. Presence, as discussed previously, can be either mediated by some form of digital or virtual technology, or non-mediated by other means such daydreaming, reading, sketching, all of which involve some form of mental modelling. The nature of the presence experienced by the designer can be spatial, perceptual, or social.

While it is not highlighted in the presence literature, this thesis also proposes that presence can be aesthetic in the full existential sense of the word; a form of presence involving embodied consciousness encompassing thoughts, feelings and
actualisation. Additionally, the findings illustrate that designers are able to adopt a ‘split subject attitude’ when in the imagined space. This allows the designer cognitively ‘detach themselves’ to the point of intervening with, and changing the space or the narrative in response to their experiences of it. In this respect, they are both occupant and creator, and can be so engaged in this process that the physical world appears to ‘fade away’. Both presence literature and the empirical findings lend support to the theory that the intensity of the immersion is related more to an initial lack of information (including sensory information) than to a situation where information is highly detailed.

The degree of sensory information is also relevant to the level of presence experienced. In the study, several designers discussed the necessity to minimise distractions in order to facilitate transportation into the imagined world. This facilitates subconscious gestation or automatic attention, as well as conscious and attentive modelling. Some designers become very expert at being able to straddle the physical world, the imagined world, and in some cases, also a digital virtual world.

Overall, the outcomes of the empirical data and the literature on presence and design research illustrate that imagining effectively supports designers at a macro, highly abstract synthesising level in the initial stages of designing. This assists in the development of an aesthetic mental model that bridges the ‘problem space’ and the ‘solution space’, thus facilitating a more refined development towards the solution space and a satisficing outcome. Once this mental model is developed, imagining operates at a micro level and then interchangeably between the macro and micro levels when undertaking simulation and facilitating aesthetic presence.

Also evident directly and indirectly in the designers’ responses is the role of attitude in facilitating engagement with the process of imagining. Some designers quite blatantly reject it particularly in the initial stages of designing. This is in contrast to existing theory and the findings of this thesis that strongly suggests the opposite. In exploiting imagining, designers need to be willing to suspend disbelief and to participate fully in hypothesises that may at first appear unremarkable or highly fanciful at this initial abstract internal level. They need to be willing to vicariously engage with others; bringing others into their imagining and as well as transporting themselves into others’ ‘being’.

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CHAPTER 7: DISCUSSION AND CONCLUSION

7.1 Introduction

As introduced in Chapter 1, this thesis project was prompted by the desire to enhance design learning for students in the spatial design disciplines of architecture and interior design. The role of imagining was of particular interest and how a richer understanding might be developed through an integration of extant theory and empirical research, therein providing the basis for future consideration by design educators. In summary, then, the main research question was:

- What is imagining in the spatial design process?

To address this question, several subsidiary questions were posed, including:

- What is imagining as experienced by interior design and architectural practitioners?
- What extant theory is relevant and, when considered with current empirical research, is likely to expand current knowledge of imagining?
- What are some initial implications for spatial design education and future research?

The purpose of this chapter is to describe and explain how the doctoral project has responded to these questions. It also highlights its limitations and the potential of these limitations, as well as the outcomes of the project providing for future research and consideration. It commences by describing and explaining how our understanding of imagining, and the role of imagining in spatial design has been enriched through this research and then what this proposes for spatial design education and further research. It also highlights additional outcomes and how these contribute to other forms of substantive and procedural knowledge.
7.2 Significance and contribution in enhancing knowledge of imagining and its role in spatial design

Procedurally our understanding of imagining, and the role of imagining in spatial design has been enriched by:

- Adopting a Grounded Theory approach (Chapter 4) involving empirical research and theoretical saturation through the integration of extant theory with the empirical findings, as well as
- Considering, as part of the extant theory, literature deemed to be relevant (presence theory) but outside the design disciplines.

Substantively, the main outcome is the SDI model that captures, more than before, the extensive and integral role imagining plays in spatial design. While an exploration of design methodology literature summarised in Chapter 2 produced contextually relevant information for the project, very little was available that explicitly focussed on imagining and that differentiated the cognitive and corporeal activities involved in designing and how they are interconnect at both macro and micro levels of designing. What was in part useful, as highlighted in the SDI model (Chapter 6), was recent research on abductive thinking and its role in the process of synthesis integral to novel, highly complex, future-oriented situations. While the emerging research on abductive thinking and framing has extended research relating to creative mental synthesis, it failed to respond convincingly to the call by Kokotovich (2000) to produce a detailed and more transparent understanding sufficient to support design education. It also (inappropriately) assumed relevance across all design disciplines.

As this doctoral research has demonstrated, closer examination of how spatial designers undertake design and the role of immersion in their designing significantly extends our understanding of designing generally as well as more specifically in the interior design and architecture disciplines. This was described in detail in Chapter 5, which presented the results of an empirical study of spatial design practitioners’ designing and imagining experiences. The outcome is encapsulated in the taxonomy of imagining qualifying imagining as visual (pictorial and spatial), (con)textual, and
aesthetic. Emerging from this research is greater recognition of the role of mental and external modelling and their interrelationships, of controlled attention in the form of embodied consciousness, as well as the subconscious in terms of incubation and gestation or what may be termed automatic attention. Identification of aesthetic imagining emphasising embodied consciousness is particularly interesting and is explored further below in terms of potential implications for design educators. The empirical study also highlighted the role of the physical environment for imagining, and actions, strategies and attitudes employed by designers in managing complexity and uncertainty aesthetically.

Integrating the outcome of a review of presence research (Chapter 3) added significantly to the emerging theory in this doctoral research. In particular it extended an understanding of how one engages with complexity through immersion and how this can be mediated through technology or otherwise. Of particular note is how less artificial mediation and a lack of detail and stimuli appears to support more aesthetic engagement. The review of presence literature identified that presence is generally restricted to spatial, physical and social forms of presence, and as such, the inclusion of aesthetic engagement was not found in current literature. In this way, the empirical study makes a contribution to presence research. In terms of presence research, it did however also highlight the role of imagining as a mediator between immersion and presence with the taxonomy of imagining developed from the empirical study also informing how this is, and can be, operationalised by designers. Presence research also contributed through its discussion on the internal/conceptual view versus the external/perceptual view. While presence research regards these as discrete, the empirical study suggests otherwise. For example, as expressed earlier, it appears designers by the very nature of the context of their creative practice have to adopt a split subject attitude, with one dimension facilitating existential engagement and the other an epistemological and aesthetic detachment facilitating interference with the world; a world where (as largely disregarded in presence literature) the participant is both occupant and creator.

In all, the doctoral research responds to a neglect in design research literature of the role of imagining in spatial design by recognising designers’ experience of imagining and the role of presence research in revealing new knowledge and a new
framework for understanding imagining. Specifically, it has unpacked the phenomenon of imagining, identifying and providing further clarity of the elements and their relationships. In doing this it has produced an enriched basis for translation to other design disciplines as well as to design education, particularly spatial design education, which is explored further in the following section along with its implications for further research.

7.3 Implications for spatial design education specifically design studio teaching

This section explores the implications of the findings for spatial design education. It does this through a focus on the design studio, the main vehicle used by design educators to teach design process. To provide a structure, the discussion uses a conceptual framework developed by Saghaﬁ, Franz and Crowther (2010) (Figure 7.1).

Figure 7.1: Factors contributing to design education adapted from Saghaﬁ, Franz and Crowther (2010) and its consideration with significant concepts emerging from the thesis

The exploration of imagining undertaken in this thesis has revealed the relationship between the internal imaginal world and the external ‘actual’ world as central to better understanding the role of imagining and enriching design process and
outcomes. It has also revealed that designers are influenced by a range of factors and that they adopt particular actions and strategies when negotiating the internal world, the external world, and the interstice between.

The empirical data illustrated that designing and the design context do not sit in isolation. Rather, the design ‘problem’ and ‘solution’ sit within broader and more complex relationships concerning the designer, the users of the future space, and the client. Additionally, the design situation also sits within a context and, as such, will always impact in some way or another, the broader community. Teal (2010) supports this, describing how the problem or design context, “has far-reaching implications on such interconnected groups and phenomena as family, community, culture, class, economy and employment” and that designers should work in a manner that requires “immersion and involvement” (Teal, 2010, p. 5) with these factors and relevant communities. For Teal (2010), existing culturally engrained practices of design actively work against this, limiting the nature and extent to which this occurs; in the process neglecting to address and respond to the “the complexities, accidents and flows that that are basic to a dynamic and vital existence” (Teal, 2010, p. 2).

As he argues, traditional design studio education generally follows a rationalistic linear path, being somewhat codified to the standard stages of professional design practice such as ‘brief development’, ‘concept development’, ‘schematic design’ and ‘design development’, ‘construction documentation’ and ‘construction administration’. For students, any contact with the design context is for the most part hypothetical and confined to the immediate client and user through the brief development stage. Where students do engage with other people as real or simulated clients and users, any additional contact is normally restricted to feedback in the schematic and design development stages. The higher education community with its systems and processes, further impact on this situation. Increasing class sizes, restrictive time slots and spaces for learning, assessment processes, and risk minimisation policies all conspire to disengage the student designer from the design context. In all, the potency of design in education and practice is severely compromised; a situation further exacerbated by a lack of knowledge of the embodied cognitive nature of design and its role in managing and capitalising on the creative richness of ambiguity.
As the empirical study shows, while there are designers who place initial emphasis on the external physical and functional requirements and eschew as folly any consideration of affective or existential aspects, there are others who commence by adopting an aesthetic, internalised process; embracing embodied, intuitive and emotional knowledge and fluidity of practice at the beginning as well as throughout the process. While these designers implicitly realise the need for, and the benefits of this approach, there has been no research that adequately qualifies this. By considering extant theory from presence research this thesis provides a deeper understanding for spatial design and the significance in adopting this approach. For example, it appears that less (rather than more) pragmatic detail inspires and informs the generation of an increased number of ideas, that the generation of these aesthetic wholes early on are central to producing innovative, robust outcomes, and that the abductive development of these wholes or aesthetic assemblages is facilitated more effectively when undertaken initially and primarily in the internal imaginal world of the designer. In contrast, design studio teaching, as is the case with practice, places emphasis on collecting as much pragmatic detail as possible early on and building towards a whole over the course of a number of stages involving as early as possible the externalisation of ideas through sketching and drawing and movement between the internal imaginal world and the external world. As Teal (2010) points out, invariably this leads to inertia as students “fish around for the best idea before moving forward” (p. 3). In this respect, “there is no right way to proceed except not to proceed; everything is connected to everything else” (Teal, 2010, p. 4).

The discussion in this section has emphasised the conceptual work of Teal (2010) and drawn connections between his work and the findings of the thesis that relate to the aesthetic whole. This is because the notion of the ‘rhizome’, which he borrows from Gilles Deleuze and Felix Guattari, has strong parallels with the aesthetic whole or assemblage as it is described in this thesis. For Teal (2010), the visualisation of the rhizome suggests immersion and dynamic experimentation, operating in a rhizomic way within, rather than reductively from without; it depends on one doing less analysis and more production. As he highlights in line with Deleuze and Guattari, and which has emerged in this research, the initial whole, assemblage or design concept is whole because it totalises its components, but it is a fragmentary whole remaining ready to respond and change. In this respect, acting rhizomically
for a designer or design student means inhabiting an emerging solution in a process of active participation and constructive exploration; an interpretive process underlined by an “anticipatory projection of meaning” (Snodgrass and Coyne, 2006, p. 38). The findings of this thesis including its emphasis on imagining provide further information on how this may be facilitated in the design studio.

One of the major responses in advocating this holistic aesthetic approach will relate to the assertion that students are not experienced designers. Some are quite young, and as such, do not have diverse and substantial episodic and contextual knowledge to draw upon. However, irrespective of age and design experience, students are embodied beings. They have a phenomenological sense of a being within the environment moving around, seeing, smelling, touching and hearing. This thesis invites educators to consider such experience a rich source for aesthetic imagining at both macro and micro levels, in the process enabling the student to develop a greater awareness of self in relation to ‘other’. It also invites explicit focus on the nature of abductive thinking and how to frame situations through greater consideration of the role of the built environment in the broader social, political and environmental context, in addition to a detailed exploration of the client and user needs and desires, both espoused and tacit.

Emerging research by interior design educators and researchers such as Poldma (2009) highlights the need for two inter-related concepts to be explicitly acknowledged in the design process: the dynamic inter-relationship between the designer and the social reality of the designed space; and the co-construction of the problem and solution space with users and stakeholders (Poldma, 2009, p. 4671):

Using these processes, the interior designer uncovers the existing social and political framing the problem, observes and discusses needs and desires with different users and stakeholders, and through aesthetic design proposals proposes new and alternative solutions that socially and politically democratize and empower those who have experiences in the spaces (Poldma, 2009, pp. 4671-4672).

This thesis supports the assertion further proposing the need to focus on this at the commencement of a spatial design course and throughout. In many respects, it
constitutes a threshold concept with celebrates and exploits design as interpretation (Rodrigo, 2010). As recognised by Rodrigo (2010) in relation to the work of Meyer and Land (2002):

[T]hreshold concepts in learning and teaching represent a transformative and irreversible way of understanding a subject, likened to a portal through which a previously inaccessible way of thinking is opened up to the learner and without which the learner cannot progress (Rodrigo, 2010, p. 1).

Traditional design studio education typically requires students to begin conceptual design expressing it as an external process through sketching and drawing from week one of the semester. However, in proposing an alternative pedagogy based on this thesis, students might be permitted a period of time contemplating and allowing ideas to gestate prior to representing their ideas visually. This places a greater emphasis on the imaginal space being liminal territory where creative ideas (which are as yet unformed) percolate with ‘inhabitation’ of the problem space and the solution space allowing for (directed and purposeful) fantasising and daydreaming, and embodied consciousness. The suspension of disbelief, which is a essential component of imaginal space, enables the students to incubate information without being too constrained or being under pressure to produce and present ideas before they understand the context or design problem in its abstracted complexity. This initial period also welcomes closer engagement with other people and understanding their lived experience of the world. Rather than going away and working alone on developing a concept, the thesis invites educators to emphasise dialogue and the development of a narrative as a space for immersion and exploration: “when designers and users construct their experiences together, then tacit forms of knowledge emerge through the experiences that are considered during various stages of the design process. This tacit nature of the design process becomes part of the experiential knowledge that is vital to understand how people appropriate and use interior spaces for their daily lives” (Poldma, 2009, p. 4673).

Some key pedagogical components emerging from this discussion include:
• Intuition: where students generate immediate associations to the design task through their own personal experience of the world and what they know about designing through their design education.

• Sensibility: where students are able to evoke a form of response or feelings during the cognitive design process that involves a broader aesthetic view; preferably one that is co-created in a dialogic situation with others.

• Productivity: where students productively generate ideas – even ideas that initially appear flawed.

• Exploration: where students, with others, explore the unknown through mental modelling and aesthetic immersion.

• Novelty: where students are encouraged to create uncommon concepts and explore novel ideas.

• Attention: where students formalise ideas through automatic and controlled attention.

• Elucidation: where students express abstract ideas experimenting initially with narrative forms of communication.

• Assessment: where students are recognised and rewarded for taking risks.

These approaches also invite discussion about assessment. Typically educators assess students on what they produce. This may involve:

• Project proposal: outline of a proposed project detailing aims and objectives, materials and methods, purpose and context, performance criteria etc.

• Models: conceptual models, work-in-progress models and individual prototypes

• Drawings/sketches: representational media including conceptual sketches, work-in-progress and final drawings

• Presentation/ ‘crit’: verbal presentation of design work to an audience of instructors, experts and/or peers
• Portfolio: an organised (curated or edited) collection of a student’s work designed to represent their achievements and effort over a period of time

• Reflective journal: a diary that encourages introspective and self-directed learning developed over time.

As conveyed, these include for the most part an emphasis on externalised representations of the end product, interior or building. A possible alternative is that for the first semester assessment focuses exclusively on productive and generative thinking (and being) in relation to a design ‘problem’ and its aesthetic and existential context. An aspect of this could involve students in critically examining their own cognitive and emotive processes and responses, and exploring various ways in which these can be communicated and shared. Once this initial emphasis has been established, students could then progress to using the more traditional process of moving between internal and external imagining with explicit attention in this case to ‘split subject attitude’, that is, learning to effectively move between an immersed embodied state and a detached critical state. At the more micro stage, students can be introduced to the different types of imagining (visual and (con)textual as well as aesthetic) and to the techniques and mechanisms that facilitate them. What should become obvious is how certain conventions and practices such axonometric drawing influence the designer’s orientation and degree of immersion in the model. Of particular note here is the use of technology in relation to its role in mediating imagining.

The current advances in digital technology have impacted on the design process and practice in ways that even half a century ago, would have seemed impossible. These days, students can access a variety of digital programs (such as Sketch Up) that are free and easy to use to develop drawings of buildings, interior spaces, and so on. Some software products even allow simulated walk-throughs of spaces. There are also technologies (such as rapid prototyping and laser cutting) used by designers, particularly in the conceptual stages of the design process to create complex three-dimensional models. However, findings of this thesis suggest that these may be a distraction inviting premature emphasis on form and visual qualities at the expense of deeper aesthetic imagining best developed internally in the initial stages. Having
said this, the findings of the thesis do invite further cross-disciplinary development of these technologies to externalise (when appropriate) internal imagining in richer more embodied ways, as discussed previously. Greater provision for, and encouragement of co-presence and collaborative immersion and exploration will help strengthen student/client relationships as well student/educator dialogue, and create a shared understanding about the process of design, not just the tangible/formal outcome of design. This will enable more explicit focussed (as opposed to tacit) development of process-based strategies, as well as increased understanding of the nature of, and the relationship between design research, design theory, design practice, design education and pedagogy.

The discussion to date also suggests reconsideration of studio culture and environment. As highlighted in this research, immersion in and exploration of the internal imaginal problem/solution space demands, for most people, minimisation of external stimuli and choice in relation to where and how they do this. Responding to this may challenge existing practices including the relationship of educators with students as well as the provision of resources and facilities. For the most part, ‘the studio’ is currently chiefly a physical space on campus where studio project based learning occurs within a designated time in the presence of fellow students and tutors. This thesis suggests greater flexibility for students to choose where, when and with whom to undertake the initial stages of the project. The potential of technology to enhance imagining and engagement adds another dimension to ‘studio learning’. The thesis proposes that the current initiatives regarding technology and blended learning also include consideration of the main points raised by this thesis and highlighted in this chapter. These emerging developments provide fertile ground for expanding the outcomes of this research, and incorporating areas that have been excluded from this study such as the role of communication in imagining.

Understandably, this will not be without challenges given decreasing resources, an increasing risk-adverse higher education environment and university demand for quality assurance involving greater transparency and learning outcomes linked directly to unit aims and objectives. As such, engaging with the ideas presented in this thesis will demand a holistic approach involving curricula and associated higher
education processes and practices as well as professional accrediting and registering body requirements.

**7.4 Wider implications and contribution**

To a large extent design cognition has remained uncharted territory. Perpetuating this is the belief that design ability stems from creative talent – it is mysterious and inaccessible; something that many practitioners exploit for various reasons in their relationship with clients. However, as Polaine (2011) points out: “We have sold what we do as magic at the cost of hiding our processes, and when we hide our processes we can no longer articulate them, teach them or give them the value they deserve” (Polaine, 2011, p. 44). In this respect, the potential of design to help address complex social and environmental issues is severely restricted. Exacerbating this is the increasing popularity of STEM – science, technology, engineering and mathematics. In all, “design research has failed to ignite public imagination with the rhetoric of STEM dominating the media” (Polaine 2011, p. 41) and, as I have witnessed in my own university, the distribution of university teaching and research resources.

As revealed in the literature review, attempts to value add through design have chiefly come from the industrial design discipline and the work of Dorst (2011) and others in exploring how design thinking can be appropriated by other disciplines such as business or marketing. Such popularisation of design thinking (that is, the notion that non-designers can think like a designer) has led only to further estrange the strategy and process of design from embodied experience and sensation (Tonkinwise 2011; Stewart 2011). According to Stewart (2011), the focus needs to shift from production and functionality to cognition, experience, processes, interfaces and relationships (Stewart, 2011, p.1).

This thesis has addressed these concerns in three ways: first, it has focussed on developing greater clarity in the early stages of design, stages that have traditionally been described as mysterious and magical; second, it has attempted to do this in a holistic way capturing the aesthetic as well as pragmatic aspects of the process; and third, it has undertaken the research from a spatial as opposed to a product perspective.
As outlined, the findings of the thesis have also been informed by extant theory outside the design disciplines, namely that developed in relation to presence research. There are many reasons to unify fragmented spheres of knowledge with concepts and methods in one discipline assisting in identification, understanding problems and issues in another (Aram, 2004, p. 382). In this thesis, presence research has been instrumental in extending our understanding of the role of imagining in immersion and creative synthesis. Equally, presence research has been informed by the empirical research conducted through this thesis and its elucidation of the aesthetic quality of imagining and the ‘split subject attitude’ of the designer. A deep conceptual understanding of the process of imagining in design in these respects is noticeably absent in presence literature. Given the findings of this research which highlight the complimentary relationship between imagining and presence, a bridge has been built between the two domains establishing grounds for future dialogue, exploration and ‘epistemological interdisciplinarity’ (Aram, 2004).

7.5 Conclusion

As outlined, this thesis was prompted by a personal interest in more effectively supporting spatial design students in the early idea generation and formation stages of designing. Responding to this and the associated need to better understand imagining in the spatial design process, a multifaceted research project was undertaken seeking to address the following sub-questions:

- What is imagining as experienced by interior design and architectural practitioners?
- What extant theory is relevant and, when considered with current empirical research, is likely to expand current knowledge of imagining?
- What are some initial implications for spatial design education and future research?

By bringing together extant theory from design methodology research, the empirical study findings, and with extant theory from presence research, two outcomes emerged that make a foundational contribution to addressing the first two questions. These are the categories of imagining taxonomy (Chapter 5) and the spatial design imagining (SDI) model (Chapter 6), which emerged by employing a Grounded Theory informed study. From within the context of Grounded Theory methodology,
the SDI model is an ‘illustrative model’ of ‘substantive Grounded Theory’ possessing both persuasive explanatory power as well as the potential for application (Birks & Mills, 2011). This is demonstrated in Chapters 5 and 6 as well as through the discussion in this chapter exploring some initial implications for spatial design, its education, and future research. Testimony to the value of this research stands in relation to its methodological congruence, that is, the alignment of a personal philosophical position (Chapter 4), the stated aims of the research (Chapter 1), and the methodological approach (Chapter 4) (Birks & Mills, 2011). It also stands in relation to its potential to bring about practice change and develop new knowledge in and for the discipline.

While the theory generated through this research may not be applied in its totality due to limitations of sampling size and geographic context, it has produced a strong theoretical foundation for future research involving the development of a formal Grounded Theory that has applicability across a number of substantive areas, and the development of strategies for implementation aimed at practical change in spatial design education.

In this respect, the thesis makes the following recommendations:

- Further research involving a wider participant pool internationally as well as nationally within the spatial design discipline to strengthen the theory of spatial design imagining and spatial design process
- Further empirical research across design disciplines (architecture, interior design, landscape architecture, industrial design, fashion and interactive design) to consolidate its discipline as well as multidiscipline relevance
- Further research outside the design disciplines such as in the presence domain to extend existing extant theory relevant for imagining and creative mental synthesis and develop opportunities for interdisciplinary research
- Development of implementation strategies by spatial design educators to apply, evaluate and extend the SDI model’s value in spatial design education
- Experimentation with various design and research methods that complement Grounded Theory or an alternative meta methodology.
In conclusion, these recommendations, building on the foundational research of imagining described in this thesis will contribute to a richer experiential understanding of creative mental synthesis. While the “the skills of synthesis, of making connections between disparate fields and data points, of making intuitive leaps based on past experiences and insight are crucial to dealing with a world that is in constant flux and whose rate of continuous change is only going to increase…” (Polaine, 2011 citing Johnson, 2010, p.43), further to this is an embodied consciousness and ability to inhabit a problem space and an emerging solution so as to respond with meaningful complexity rather than superficial affectivity or levelled uniformity (Teal, 2010, p. 9).
REFERENCES


Dennett, D. C. (2002). Does Your Brain Use the Images in It, and If So, How?
*Behavioral and Brain Sciences* (25) 189-190.


Forbus, K., Gentner, D., Markman, A. & Ferguson, R.(1997). Analogy just looks like high-level perception: Why a domain-general approach to analogical
mapping is right. *Journal of Experimental and Theoretical Artificial Intelligence (JETI)* 4, 185-211.


Green, M. C., & Brock, T. C. (2002). In the mind’s eye: Transportation-imagery model of narrative persuasion. In M. C. Green, J. J. Strange, & T. C. Brock (Eds.). *Narrative Impact: Social and Cognitive Foundations*. 


APPENDIX A: ETHICAL CLEARANCE AND PARTICIPANT CONSENT FOR THE EXPLORATORY STUDY
**Level 1 (Low Risk)**

Application for Approval to Undertake Research Involving Human Participants

A significant proportion of research which involves the participation of humans, or impacts upon humans, can be approved under Level 1. The University has established a process which enables researchers to confirm whether or not their project falls within this Level and the following types of research may qualify:

- Human research with no significant risks or ethical issues (before the implementation of any risk management strategies associated with the research design), and
- Anonymous questionnaires, surveys or interviews involving non-sensitive matters.

By completing this form the researcher considers that their project would qualify for Level 1 clearance and would not require full ethical review by the University. Projects which qualify for review under Level 1 are considered by the Chair, University Human Research Ethics Committee (UHREC). Please forward the completed form to the Research Ethics Officer, Office of Research, O Block Podium, Gardens Point Campus.

### Section One

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Presence in Interior Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chief Investigator</strong></td>
<td>Manisha McAuliffe</td>
</tr>
<tr>
<td>FACULTY</td>
<td>BEE</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>School of Design</td>
</tr>
<tr>
<td>TELEPHONE</td>
<td>07 3864 1265</td>
</tr>
<tr>
<td>EMAIL</td>
<td><a href="mailto:mb.mcauliffe@qut.edu.au">mb.mcauliffe@qut.edu.au</a></td>
</tr>
<tr>
<td>CONTACT ADDRESS</td>
<td>33 Marian St Coorparoo 4151</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supervisor (if relevant)</th>
<th>Associate Professor Jill Franz</th>
</tr>
</thead>
<tbody>
<tr>
<td>TELEPHONE</td>
<td>07 3864 2674</td>
</tr>
<tr>
<td>EMAIL</td>
<td><a href="mailto:j.franz@qut.edu.au">j.franz@qut.edu.au</a></td>
</tr>
</tbody>
</table>

**Other Investigators**

- 
- 

**Duration of the Project**

From **19**/**/**/2005 to **11**/**/**/2005.
**Section Two**

<table>
<thead>
<tr>
<th>Q.1</th>
<th>Respondent's identity</th>
<th>T</th>
<th>Q.8</th>
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</tr>
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<tbody>
<tr>
<td>Q.2</td>
<td>Unable to consent</td>
<td>N</td>
<td>Q.9</td>
<td>Ionising radiation</td>
<td>N</td>
</tr>
<tr>
<td>Q.3</td>
<td>Minors</td>
<td>N</td>
<td>Q.10</td>
<td>Commonwealth Privacy Act</td>
<td>N</td>
</tr>
<tr>
<td>Q.4</td>
<td>Dependent relationship</td>
<td>N</td>
<td>Q.11</td>
<td>Inducements</td>
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</tr>
<tr>
<td>Q.5</td>
<td>Cultural issues</td>
<td>N</td>
<td>Q.12</td>
<td>Sensitive information</td>
<td>N</td>
</tr>
<tr>
<td>Q.7</td>
<td>Tissue extraction</td>
<td>N</td>
<td>Q.13</td>
<td>Deception</td>
<td>N</td>
</tr>
</tbody>
</table>

**Section Three**

<table>
<thead>
<tr>
<th>Q.15</th>
<th>Who will be approached to participate in the project?</th>
<th>Students undertaking ADBI04 Semester 2, 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How many participants will be included in the subject pool?</td>
<td>Approximately 70</td>
</tr>
<tr>
<td></td>
<td>How will the participants be recruited?</td>
<td>They will be asked for their permission before the study begins</td>
</tr>
<tr>
<td></td>
<td>Will the potential participants be screened?</td>
<td>No</td>
</tr>
</tbody>
</table>

For further information regarding the recruitment of participants, please refer to Booklet 10 of the University Human Research Ethics Manual.

<table>
<thead>
<tr>
<th>Q.16</th>
<th>Questionnaire</th>
<th>N</th>
<th>Surveys</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Focus Groups</td>
<td>N</td>
<td>Other instruments (Please provide details)</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Archival Records</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please provide a copy of the relevant instrument protocol or other written form used to guide or collect data or include an explanation of the method by which the data will be collected.

For further information regarding questionnaire based research, please refer to Booklet 24 of the University Human Research Ethics Manual.
Q.17 What consent mechanism will be provided to participants? (Voluntary and informed consent must be obtained from research participants, even when the project is low risk)

<table>
<thead>
<tr>
<th>Consent Mechanism</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal consent script</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Written informed consent package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questionnaire cover sheet</td>
<td></td>
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</tbody>
</table>

Other consent mechanism: Please provide a copy of the consent mechanism or an explanation and justification of how consent will otherwise be obtained.

(For further information regarding the preparation of informed consent packages, please refer to Section 11 of the University Human Research Ethics Manual)

Section Four

DECLARATION BY CHIEF INVESTIGATOR

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University.

I will notify the Research Ethics Officer immediately of any adverse effects arising from this study, such as unexpected adverse outcomes, unexpectedly adverse community/subject risk factors or complaints, etc.

I will request approval from the University Human Research Ethics Committee for any divergence from the protocol which would result in any change to the responses provided in this application.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body or with any commercial activity in regard to this research project. (If necessary, please provide details and indicate how they will be managed).

Signed: ____________________________

Date: 23 / 06 / 2005

Chief Investigator or postgraduate research supervisor.

Please forward advice to Research Students Section Y / N

Relates to: ____________________________ study

Please forward advice to Research Grants Section Y / N

Relates to: ____________________________ grant

DECLARATION BY POSTGRADUATE RESEARCH SUPERVISOR (IF APPROPRIATE)

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University.

The qualifications and experience of the Chief Investigators is appropriate to the study to be undertaken.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body, with the supervision of the research student, or with any commercial activity in regard to this research project. (If necessary, please provide details and indicate how they will be managed).

Signed: ____________________________

Date: ____________________________

HEAD OF SCHOOL / CENTRE DIRECTOR / HEAD OF DISCIPLINE

NOTE: When the Head of School, Centre Director or Head of Discipline is also a listed applicant (or is supervisor for the project), the Dean or Associate Dean (Research) should sign below.

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University.

The qualifications and experience of the Chief Investigators is appropriate to the study to be undertaken. The research and safety issues associated with this research have been considered and approved.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body, the supervision of the research student, or with any commercial activity in regard to this research project. (If necessary, please provide details and indicate how they will be managed).

Signed: ____________________________

Name (Print): ____________________________

Position: ____________________________

Date: ____________________________
PARTICIPANT INFORMATION for QUT RESEARCH PROJECT

“Presence and Virtuality in Interior Architecture”

Research Team Contacts

Marsha McAuliffe
ph: 07 3138 2287
mb.mcauliffe@qut.edu.au

Description
This project is being undertaken as part of a PhD for Marsha McAuliffe.

The purpose of this project is to examine how interior designers learn how to design interior spaces.

Participation
Your participation in this project is voluntary. If you do agree to participate, you can withdraw from participation at any time during the project without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT (for example your grades).

Your participation will involve an interview and a focus group. This will be undertaken at the end of the semester and will involve you discussing with the researcher (Marsha) about the way that you design. The project is your Project One for ADE104.

Expected benefits
It is expected that this project will not benefit you. However, it may benefit designers for the future, as well as people and the spaces in which they work and live.

Risks
There are no risks beyond normal day-to-day living associated with your participation in this project.

Confidentiality
All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses.

The comments from the interviews or focus groups, will not be verified by the participants prior to final inclusion; they will be labeled as ‘anonymous’.

Consent to Participate
We would like to ask you to sign a written consent form (enclosed) to confirm your agreement to participate.

Questions / further information about the project
Please contact the researcher team members named above to have any questions answered or if you require further information about the project.

Concerns / complaints regarding the conduct of the project
QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Officer on 3645 2360 or ethics.contact@qut.edu.au. The Research Ethics Officer is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.
CONSENT FORM for QUT RESEARCH PROJECT

“Presence and Virtuality in Interior Architecture”

Statement of consent

By signing below, you are indicating that you:

- have read and understood the information document regarding this project;
- have had any questions answered to your satisfaction;
- understand that if you have any additional questions you can contact the research team;
- understand that you are free to withdraw at any time, without comment or penalty;
- understand that you can contact the Research Ethics Officer on 3864 2340 or ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project;
- agree to participate in the project.

Name

________________________________________

Signature

________________________________________

Date

_____ / _____ / _____

By signing below, you are indicating that the project has been discussed with you and you agree to participate in the project.

Name

________________________________________

Signature

________________________________________

Date

_____ / _____ / _____
PARTICIPANT INFORMATION for QUT RESEARCH PROJECT

“How Designers design”

Research Team Contacts
Marisha McAuliffe (Assoc. Lecturer)
0433261977
mb.mcauliffe@qut.edu.au

Description
This project is being undertaken as part of a PhD project for Marisha McAuliffe.

The purpose of this project is to investigate the notion of immersion (presence) in architecture and design and the sense of experience rather than the form of these environments. Therefore, we begin to address these issues in a deeper context by reflecting on our design and design practice. This methodology is a form of self-assessment, and is referred to as reflective practice.

The research team requests your assistance to find out how you design, as a novice designer, designs – whether using traditional methods, digital technology or a mixture of the both.

Participation
Your participation in this project is voluntary. If you do agree to participate, you can withdraw from participation at any time during the project without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT (for example your grades).

Your participation is in the form of questionnaires (both online and offline) and interviews. Some of the interviews may be recorded (via tape recording) but following transcriptions, the tapes will be destroyed. Your privacy will be protected as you will remain anonymous.

Expected benefits
It is expected that this project will not benefit you directly; however it aims to benefit future designers.

Risks
There are no risks beyond normal day-to-day living associated with your participation in this project.

Confidentiality
All comments and responses are anonymous and will be treated confidentially.

Consent to Participate
The return of the completed questionnaire is accepted as an indication of your consent to participate in this project.
CONSENT FORM for QUT RESEARCH PROJECT

“How designers design”

Statement of consent

By signing below, you are indicating that you:

• have read and understood the information document regarding this project
• have had any questions answered to your satisfaction
• understand that if you have any additional questions you can contact the research team
• understand that you are free to withdraw at any time, without comment or penalty
• understand that you can contact the Research Ethics Officer on 3139 2340 or ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project
• agree to participate in the project

Name: ________________________________________________________________
Signature: ____________________________________________________________
Date: __________/____________/____________

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APPENDIX B: ETHICAL CLEARANCES FOR PRIMARY STUDY
A significant proportion of research which involves the participation of humans, or impacts upon humans, can be approved under Level 1. The University has established a process which enables researchers to confirm whether or not their project falls within this Level and the following types of research may qualify:

- Human research with no significant risks or ethical issues (before the implementation of any risk management strategies associated with the research design); and
- Anonymous questionnaires, surveys or interviews involving non-sensitive matters.

By completing this form the researcher considers that their project would qualify for Level 1 clearance and would not require full ethical review by the University. Projects which qualify for review under Level 1 are considered by the Chair, University Human Research Ethics Committee (UMREC). Please forward the completed form to the Research Ethics Officer, Office of Research, O Block Podium, Gardens Point Campus.

### Section One

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Presence in Interior Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Investigator</td>
<td>Marisha McAuliffe</td>
</tr>
<tr>
<td>FACULTY</td>
<td>BEE</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>School of Design</td>
</tr>
<tr>
<td>TELEPHONE</td>
<td>07 3138 2282</td>
</tr>
<tr>
<td>EMAIL</td>
<td><a href="mailto:mb.mcauliffe@qut.edu.au">mb.mcauliffe@qut.edu.au</a></td>
</tr>
<tr>
<td>CONTACT ADDRESS</td>
<td>11 Ascot Street, Goodna</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Supervisor (if relevant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TELEPHONE</td>
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<table>
<thead>
<tr>
<th>Other Investigators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
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### DURATION OF THE PROJECT

from _15 / _3 / 2008_ to _15 / _9 / 2008_
### Section Two

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
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<tbody>
<tr>
<td>Q.1</td>
<td>Possible for individual, business or community group to be identified by the publisher?</td>
</tr>
<tr>
<td>Q.2</td>
<td>Unable to consent</td>
</tr>
<tr>
<td>Q.3</td>
<td>Minors</td>
</tr>
<tr>
<td>Q.4</td>
<td>Dependent relationship</td>
</tr>
<tr>
<td>Q.5</td>
<td>Cultural issues</td>
</tr>
<tr>
<td>Q.6</td>
<td>Treatment/Procedures/Tests</td>
</tr>
<tr>
<td>Q.7</td>
<td>Tissue extraction</td>
</tr>
</tbody>
</table>

Please insert Yes or No to indicate your answer to the following questions.

- **Q.1** Respondent's identity: Is it possible for individual, business or community group to be identified by the publisher? [Yes] [No]
- **Q.2** Unable to consent: [Yes] [No]
- **Q.3** Minors: [Yes] [No]
- **Q.4** Dependent relationship: [Yes] [No]
- **Q.5** Cultural issues: [Yes] [No]
- **Q.6** Treatment/Procedures/Tests: [Yes] [No]
- **Q.7** Tissue extraction: [Yes] [No]

### Section Three

- **Q.15** Who will be approached to participate in this project?
  - Designers from the architecture and interior design practices
  - How many participants will be involved in the project:
    - Approximately 200
  - How will the participants be recruited:
    - Designers will be emailed a survey requesting their participation
  - Will the potential participants be screened:
    - No

For further information regarding the recruitment of participants, please refer to Booklet 10 of the [University Human Research Ethics Approval].

- **Q.16** What data collection procedures will be utilized (questionnaires, surveys, interviews, focus groups)?
  - Questionnaire: Y
  - Survey: N
  - Interviews: N
  - Focus Groups (open, semi-structured): N
  - Other instrument (Please see attached Unit): N
  - Archival Records: N
  - Other data (please see Unit): N

Please provide a copy of the relevant instrument, questionnaire or other written form used to guide or collect data or include an explanation of the method by which the data will be collected.

For further information regarding questionnaire-based research, please refer to Booklet 14 of the [University Human Research Ethics Approval].
Q.17
What consent mechanism will be provided to participants? (Voluntary and informed consent must be obtained from research participants, even when the project is low risk.)

<table>
<thead>
<tr>
<th>Consent Mechanism</th>
<th>Y</th>
<th>Y</th>
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<tbody>
<tr>
<td>Verbal consent</td>
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<td>Written informed consent package</td>
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<td></td>
</tr>
<tr>
<td>Questionnaire cover sheet</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

Please provide a copy of the consent mechanism or an explanation and justification of how consent will otherwise be obtained.

(For further information regarding the preparation of informed consent packages, please refer to section 11 of the University Human Research Ethics Manual.)

Section Four

DECLARATION BY CHIEF INVESTIGATOR

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University. I will notify the Research Ethics Officer immediately of any adverse effects arising from this study (e.g., unexpected adverse outcomes, unexplained community/subject risk factors or complaints, etc.).

I request approval from the University Human Research Ethics Committee for any divergence from the protocol which would result in any change to the responses provided in this application.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body or with any commercial activity in regard to this research project. (If necessary, please list funds and indicate how this will be managed.)

Signed: ____________________________

Date: ____________________________

Chief Investigator to circle as required

Please forward advice to Research Students Section | Y / N | Related to: ____________________________ study

Please forward advice to Research Grants Section | Y / N | Related to: ____________________________ grant

DECLARATION BY POSTGRADUATE RESEARCH SUPERVISOR (IF APPLICABLE)

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University. The qualifications and experience of the Chief Investigators is appropriate to the study to be undertaken.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body, with the supervision of the research student, or with any commercial activity in regard to this research project. (If necessary, please list funds and indicate how this will be managed.)

Signed: ____________________________

Date: ____________________________

HEAD OF SCHOOL / CENTRE DIRECTOR / HEAD OF DISCIPLINE:

NOTE: When the Head of School, Centre Director or Head of Discipline is also a listed applicant (or is a supervisor for the project) the Dean or Associate Dean (Research) should sign below.

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University. The qualifications and experience of the Chief Investigators is appropriate to the study to be undertaken. The research and safety issues associated with this research have been considered and approved.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body, with the supervision of the research student, or with any commercial activity in regard to this research project. (If necessary, please list funds and indicate how this will be managed.)

Signed: ____________________________

Name (print): ____________________________

Position: ____________________________

Date: ____________________________

273
Participant Information Sheet

“Presence in Interior Architecture”
Marisha McAuliffe
mb.mcauliffe@qut.edu.au
07 5136 2262

Description
This project is being undertaken as part of a PhD project for Marisha McAuliffe.
The purpose of this project is to examine the conceptual design process within interior architecture and design.

Participation
Your participation is requested in completing the attached survey.

Expected benefits
Whilst this research project does not directly benefit you, the outcomes of the project will potentially benefit interior architecture and design practice for the future.

Risks
There are no risks associated with your participation in this project, as the outcome and comments of the questionnaires will be treated as confidential.

Confidentiality
All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses.

Voluntary participation
Your participation in this project is voluntary. If you do not agree to participate, you can withdraw from participation at any time during the project without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT.

Questions / further information
Please contact the researchers if you require further information about the project, or to have any questions answered.

Concerns / complaints
Please contact the Research Ethics Officer on 3136 2240 or research@qut.edu.au if you have any concerns or complaints about the ethical conduct of the project.
Participant Information Sheet

“Presence in Interior Architecture”

Marsha McAuliffe
mh.mcauliffe@qut.edu.au
07 3138 2282

The purpose of this survey is to understand presence and its relationship to imaging in the design process. As there have been no other comprehensive studies of this nature done on this research to date, it is anticipated that the information obtained will be of considerable benefit to all those involved in design and through it a better understanding of the design process will be obtained. This survey is a major part of a PhD study by Marsha McAuliffe into the design process, so your participation would be greatly appreciated.

The questionnaire is in three sections. The first section deals with information about you, the second section is about designing in general, and the third section focuses on how you as a designer, design. The questionnaire has been distributed to people within the design community—architects and interior designers, as well as students undertaking their design degree. Because of the differences in the two groups, some people may find a few of the questions rather unnecessary or obvious, whilst others may find them difficult to answer. It's important that you answer all the questions so that we can compare responses of the different groups of people for each question. There are no right or wrong responses.

Please do not hesitate to write all your thoughts down as you complete the questionnaire. Your comments are of particular interest to me. All information in the questionnaire will remain completely anonymous and confidential and at no time will any identifying information be made available to anyone other than myself (Marsha McAuliffe). Your participation in this project is voluntary and you can withdraw from participation at any time without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT and your privacy will be protected as you will remain anonymous.

If you have any questions or concerns you may contact me either by phone on 07 3138 2282 or by email on mh.mcauliffe@qut.edu.au. I am very happy to receive your responses by email. I thank you for your cooperation. Look forward to receiving these responses by the 26th June, 2008.

Marsha McAuliffe

Participant information

It is important that we know a little about the people completing these questionnaires. It would be very useful if you could answer the following questions about yourself. Your participation in this project is voluntary and you can withdraw from participation at any time without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT. Your privacy will be protected as you will remain anonymous.
<table>
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<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
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1.1 Highest level of education completed (e.g. grade/level, tertiary diploma or degree; certificate or trades qualifications; etc.)
1.2 Country in which you completed your education
1.3 What is your education in design?
1.4 What is your discipline?
1.5 Is this the discipline that you usually work within?
1.6 If not, what is the discipline?
1.7 If you are a student, are you working in industry?
1.8 If so, how long have you been working in industry?

Section 2: Information about design process in general
(Please note: for each question you may write as much as you wish)

2.1 What is your understanding of the process of design in the conceptualisation and schematic stages?

2.2 Do you think imagination plays a part in these early stages of the design process? If so, why; if not, why not?

2.3 How important is it to you to consider the emotive qualities of what you are designing? Why or why not?
Section 3: Information about how you design

3.1 When you commence a design process, can you please describe the process you go through from conceptualisation to design development?

3.2 Could you describe the role of visualisation in the process you described above?

3.4 When you are visualising, where do you imagine/perceive yourself to be?

3.5 Do you see yourself and/or others as undertaking an activity within the space? Could you describe this?

3.6 What facilitates the imagined experience; what contributes to it?

3.7 In your mind, do you engage with this space in a physical manner? For example, do you feel temperature, hear sounds and ‘see’ light?

3.8 At the start of the design process, do you visualise the outcome in some way? If so, please describe
3.9 Could you describe what you “see in your mind’s eye” whilst designing?


3.10 Is the outcome of your design usually similar to what you had originally ‘pictured’ or imagined it to be? Please describe


3.11 When you are designing, how conscious are you of the world in which you are physically located? For example, your office environment, other people, etc. Please explain.


4.1 Please provide additional comments if you wish.


Thank you very much for your time and attention on completing this questionnaire.

Marisha McAliff
LEVEL 1 (Low Risk)
APPLICATION FOR APPROVAL TO UNDERTAKE
RESEARCH INVOLVING HUMAN PARTICIPANTS

A significant proportion of research which involves the participation of humans, or impacts upon humans, can be approved under Level 1. The University has established a process which enables researchers to confirm whether or not their project falls within this Level and the following types of research may qualify:

- Human research with no significant risks or ethical issues (before the implementation of any risk management strategies associated with the research design); and
- Anonymous questionnaires, surveys or interviews involving non-sensitive matters.

By completing this form the researcher considers that their project would qualify for Level 1 clearance and would not require full ethical review by the University. Projects which qualify for review under Level 1 are considered by the Chair, University Human Research Ethics Committee (UHREC). Please forward the completed form to the Research Ethics Officer, Office of Research, O Block Podium, Gardens Point Campus.

Section One

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Presence in Interior Architecture</th>
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<tbody>
<tr>
<td>Chief Investigator</td>
<td>Marisha McAuliffe</td>
</tr>
<tr>
<td>FACULTY</td>
<td>BEE</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>School of Design</td>
</tr>
<tr>
<td>TELEPHONE</td>
<td>07 3135 2282</td>
</tr>
<tr>
<td>EMAIL</td>
<td><a href="mailto:mb.mcauliffe@qut.edu.au">mb.mcauliffe@qut.edu.au</a></td>
</tr>
<tr>
<td>CONTACT ADDRESS</td>
<td>11 Ascot Street, Goodna</td>
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<table>
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<th>Supervisor (if relevant)</th>
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<tr>
<th>Other Investigators</th>
<th>Nil</th>
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DURATION OF THE PROJECT
from 15/12/2008 to 15/06/2009
DESCRIPTION OF PROJECT

Please provide an electronic description of the project (in terms which are easily understood by the lay reader, using non-technical language) to the Research Ethics Officer (ethicscontact@usi.edu.au).

Final approval for your project cannot be issued until this has been provided.

Section Two

Please insert Yes or No to indicate your answer to the following questions:

Q.1 Respondent's identity
   Is it possible for an individual business or community group to be identified by the published data? [ ] Yes [ ] No
   Will the study involve participants who are unable to give informed consent? [ ] Yes [ ] No

Q.2 Minor
   Does the proposed research involve the active participation of minors? [ ] Yes [ ] No
   Will the study involve the participants who are in a dependent or independent relationship? [ ] Yes [ ] No

Q.3 Cultural Issues
   Will the study involve the participants who are in a dependent or independent relationship? [ ] Yes [ ] No
   Is the research likely to result in the destruction of or psychological distress to result from the study? [ ] Yes [ ] No

Q.4 Dependent relationship
   Does the project include the use of involving radiation? [ ] Yes [ ] No
   Will the research involve the disclosure of personal information by a Commonwealth agency that may breach information privacy principles? [ ] Yes [ ] No

Q.5 Treatment / Procedures / Tests
   Will payment or other financial inducements be offered to participants? [ ] Yes [ ] No
   Will the research involve the questions about sensitive aspects of participants' behaviour regarding conduct, drug use, sexual behaviour, religious belief? [ ] Yes [ ] No

Q.6 Tissue extraction
   Could disclosure of respondents outside the research place the participant at risk of harm, disfigurement, financial standing, or employability? [ ] Yes [ ] No
   Will blood, body fluid or tissue samples be obtained from participants? [ ] Yes [ ] No

Section Three

Q.15 What will be approached to participate in the project?
   Designers from the architectural and interior design practice
   How many participants will be included in the study plan? [ ] Approximately 20
   How will the participants be recruited? Designers will be emailed requesting an interview at their convenience.
   Will the potential participants be screened? [ ] Yes [ ] No

Q.16 What data collection procedures will be utilised? Questionnaires, survey, interviews or focus groups?
   Questionnaire [ ] Yes [ ] No
   Survey [ ] Yes [ ] No
   Interviews [ ] Yes [ ] No
   Focus Groups (open, semi-structured and unstructured) [ ] Yes [ ] No
   Other Instrument (Please see attached Unit A) [ ] Yes [ ] No
   Archival Records (outlined - studio brief) [ ] Yes [ ] No

*Please provide a copy of the relevant instrument, protocol, or written form used to guide or collect data or include an explanation of the method by which the data will be collected.

For further information regarding questionnaire-based research, please refer to Booklet 10 of the University Human Research Ethics Manual.
Section Four

DECLARATION BY CHIEF INVESTIGATOR

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University.

I will notify the Research Ethics Officer immediately of any adverse effects arising from this study (eg. unexpected adverse outcomes, unexpected community (subject) risk factors or complaints, etc.).

I will request approval from the University Human Research Ethics Committee for any divergence from the protocol which would result in any change to the responses provided in this application.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body or with any commercial activity in regard to this research project. (If there are any conflicts of interest, please provide details and indicate how this will be managed.)

Signed:

Date: 15 / 12 / 2008

Chief Investigator to circle as required

Please forward advice to Research Students Section Y / N

Y / N Relates to: ______________ study

Please forward advice to Research Grants Section

Y / N Relates to: ______________ grant

DECLARATION BY POSTGRADUATE RESEARCH SUPERVISOR (IF APPLICABLE)

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University.

The qualifications and experience of the Chief Investigator is appropriate to the study to be undertaken.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body, with the supervision of the research student, or with any commercial activity in regard to this research project. (If there are any conflicts of interest, please provide details and indicate how this will be managed.)

Signed:

Date: _______ / _______ / _______

HEAD OF SCHOOL / CENTRE DIRECTOR / HEAD OF DISCIPLINE

NOTE: When the Head of School, Centre Director or Head of Discipline is also a listed applicant (or is a supervisor for the project) the Dean or Associate Dean (Research) should sign below.

I believe that this project qualifies for Level 1 clearance and does not require full ethical review by the University.

The qualifications and experience of the Chief Investigators is appropriate to the study to be undertaken. The research method and safety issues associated with this research have been considered and approved.

There are no perceived or actual conflicts of interest (for definition refer to Code of Conduct for Research) with any funding body, with the supervision of the research student, or with any commercial activity in regard to this research project. (If there are any conflicts of interest, please provide details and indicate how this will be managed.)

Signed:

Name (print):

Position:

Date: _______ / _______ / _______
Participant Information Sheet

“Presence in Interior Architecture”

Marisha McAuliffe
mb.mcauliffe@qut.edu.au
07 3138 2282

Description
This project is being undertaken as part of a PhD project for Marisha McAuliffe.

The purpose of this project is to examine the conceptual design process within interior architecture and design.

Participation
You participation is requested for an interview of approximately 30 minutes at the location you request.

Expected benefits
Whilst this research project does not directly benefit you, the outcomes of the project will potentially benefit interior architecture and design practice for the future.

Risks
There are no risks associated with your participation in this project, as the outcome and comments of the interviews will be treated as confidential.

Confidentiality
All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses.

Voluntary participation
Your participation in this project is voluntary. If you do agree to participate, you can withdraw from participation at any time during the project without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT.

Questions / further information
Please contact the researchers if you require further information about the project, or to have any questions answered.

Concerns / complaints
Please contact the Research Ethics Officer on 3138 2340 or ethicscontact@qut.edu.au if you have any concerns or complaints about the ethical conduct of the project.
Participant Information Sheet

“Presence in Interior Architecture”

Marasha McAuliffe
mb.mcauliffe@qut.edu.au
07 3138 2282

Statement of consent

By signing below, you are indicating that you:

- have read and understood the information sheet about this project;
- have had any questions answered to your satisfaction;
- understand that if you have any additional questions you can contact the research team;
- understand that you are free to withdraw at any time, without comment or penalty;
- understand that you can contact the research team if you have any questions about the project, or the Research Ethics Officer on 3138 2340 or ethicscom@qut.edu.au if you have concerns about the ethical conduct of the project;
- agree to participate in the project.

Name ____________________________________________

Signature _________________________________________

Date _____ / _____ / _____
The questions below will be carried out in an interview and will only be used as a guide, rather than as a 'fixed structure'. Where some responses require more information, questions will be asked to clarify.

Please tell me about your design practice experience.

What is your understanding of the process of design in the conceptualisation and schematic stages?

Do you think imagination plays a part in these early stages of the design process? If so, why; if not, why not?

How important is it to you to consider the emotive qualities of what you are designing? Why or why not?

When you commence a design process, can you please describe the process you go through from conceptualisation to design development?

How important is the role of visualisation in the process of conceptualisation in design?

When you are visualising during the design process, where do you imagine / perceive yourself to be?

How real is the space that you are visualising? Can you describe an activity that is similar?

When you are visualising, do you see yourself and/or others as undertaking an activity within the space? Can you please describe this?

What facilitates the imagination experience and what contributes to it?

In your mind, do you engage with this space in a physical manner – for example, do you feel temperature, hear sounds and 'see' light?

At the start of the design process, do you visualise the outcome in some way? If so, please describe.

Could you describe what you 'see in your mind’s eye' whilst designing?

Is the outcome of your design usually similar to what you had originally 'pictured' or imagined it to be? Can you please describe this?

When you are designing, how conscious are you of the world in which you are physically located? Are you aware of others around you while you are designing?
The purpose of this survey is to understand presence and its relationship to imaging in the design process. As there have been no other comprehensive studies of this nature done on this research to date, it is anticipated that the information obtained will be of considerable benefit to all those involved in design and through it a better understanding of the design process will be obtained. This survey is the major part of a PhD study by Marisha McAuliffe into the design process, so your participation would be greatly appreciated.

The questionnaire is in three sections. The first section deals with information about you, the second section is about designing in general, and the third section focuses on how you, as a designer, designs. The questionnaire has been distributed to people within the design community - architects and interior designers, as well as students undertaking their design degree. Because of the differences in the two groups, some people may find a few of the questions rather unnecessary or obvious, whilst others may find them difficult to answer. It is important that you answer all the questions so that we can compare responses of the different groups of people for each question. There are no right or wrong responses.

Please do not hesitate to write all your thoughts down as you complete the questionnaire. Your comments are of particular interest to me. All information in the questionnaire will remain completely anonymous and confidential and at no time will any identifying information be made available to anyone other than myself (Marisha McAuliffe). Your participation in this project is voluntary and you can withdraw from participation at any time without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT and your privacy will be protected as you will remain anonymous.

If you have any questions or concerns you may contact me either by phone on 07 3138 2282 or by email on mb.mcauliffe@qut.edu.au. I am very happy to receive your responses by email. I thank you for your cooperation look forward to receiving those responses by the 6th June, 2008.

Marisha McAuliffe

Participant information

It is important that we know a little about the people completing these questionnaires. It would be very useful if you could answer the following questions about yourself. Your participation in this project is voluntary and you can withdraw from participation at any time without comment or penalty. Your decision to participate will in no way impact upon your current or future relationship with QUT. Your privacy will be protected as you will remain anonymous.

Section 1: Information about you
If you are a student, what course are you currently enrolled in?___________________

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<th>Age group</th>
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<td>35 – 44</td>
<td></td>
<td>75 or over</td>
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</table>

Gender  Male  Female

1.1 Highest level of education completed____________________________________
(e.g. grade/year level; tertiary diploma or degree; certificate or trades qualifications; etc.)

1.2 Country in which you completed your education___________________________

1.3 What is your education in design?______________________________________

1.4 What is your discipline?______________________________________________

1.5 Is this the discipline that you usually work within?_______________________

1.6 If not, what is the discipline?_________________________________________

1.7 If you are a student, are you working in industry?_______________________

1.8 If so, now long have you been working in industry?_______________________

Section 2: Information about design process in general

(Please note: for each question you may write as much as you wish)

2.1 What is your understanding of the process of design in the conceptualisation and
schematic stages?

______________________________________________________________________

______________________________________________________________________

2.2 Do you think imagination plays a part in these early stages of the design process? If so,
why; if not, why not?
2.3 How important is it to you to consider the emotive qualities of what you are designing? Why or why not?

Section 3: Information about how you design

3.1 When you commence a design process, can you please describe the process you go through from conceptualisation to design development?

3.2 Could you describe the role of visualisation in the process you described above?

3.3/4 When you are visualising, where do you imagine / perceive yourself to be?

3.5 Do you see yourself and /or others as undertaking an activity within the space? Could you describe this?

3.6 What facilitates the imagined experience; what contributes to it?
3.7 In your mind, do you engage with this space in a physical manner – for example, do you feel temperature, hear sounds and ‘see’ light?

________________________________________________________________________

________________________________________________________________________

3.8 At the start of the design process, do you visualise the outcome in some way? If so, please describe.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3.9 Could you describe what you "see in your mind's eye" whilst designing?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3.10 Is the outcome of your design usually similar to what you had originally ‘pictured’ or imagined it to be? Please describe.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3.11 When you are designing, how conscious are you of the world in which you are physically located? For example, your office environment, other people, etc. Please explain.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4.1 Please provide additional comments if you wish.

________________________________________________________________________

Thank you very much for your time and attention on completing this questionnaire.

Marisha McAuliffe
APPENDIX D: INTERVIEW QUESTIONS
Faculty of Built Environment and Engineering

Interview Questions

Please tell me about your design practice experience.

What is your understanding of the process of design in the conceptualisation and schematic stages?

Do you think imagination plays a part in these early stages of the design process? If so, why; if not, why not?

How important is it to you to consider the emotive qualities of what you are designing? Why or why not?

When you commence a design process, can you please describe the process you go through from conceptualisation to design development?

How important is the role of visualisation in the process of conceptualisation in design?

When you are visualising during the design process, where do you imagine / perceive yourself to be?

How real is the space that you are visualising? Can you describe an activity that is similar?

When you are visualising, do you see yourself and /or others as undertaking an activity within the space? Can you please describe this?

What facilitates the imagination experience and what contributes to it?

In your mind, do you engage with this space in a physical manner – for example, do you feel temperature, hear sounds and ‘see’ light?

At the start of the design process, do you visualise the outcome in some way? If so, please describe

Could you describe what you "see in your mind's eye" whilst designing?

Is the outcome of your design usually similar to what you had originally ‘pictured’ or imagined it to be? Can you please describe this?

When you are designing, how conscious are you of the world in which you are physically located? Are you aware of others around you while you are designing?
APPENDIX E: EXAMPLES OF PRIMARY DATA COLLECTION – THE QUESTIONNAIRE (STAGE 1) RESPONSES, MEMOING AND NOTES
1. It is a stage of exploration and getting all thoughts and ideas down for the project. Capturing initial visions and first images of what the design would look like after reading the brief. Researching thoroughly every aspect of the brief with the intention of further informing and developing the design first envisioned.

2. Taking general detail of client requirements, site specific details, town planning requirements and building regulations to be used to prepare preliminary concept drawings and final sketch plans.

3. Getting the brief correct. What is the question that the design process has to solve? There are many correct answers to the wrong question. We spend too little time on defining the issues and instead start designing around preconceived concepts.

4. The two stages are entwined – it is the play between the idea and the possibility of the idea(s) that meets the client’s requirements on the one part and the designer’s possibility on the other. The schematic stage is completed after the possibilities have been explored in the form of a series of sketches or cartoons and have been crystallised into a presentable form (using the most appropriate media) to the client for consideration – but as yet – this is not the design!

5. I take time to study the site, and the people and the culture of a place. In briefing, I seek the questions behind the answers with which I am presented, in site study I deeply consider the local ecology and observe natural responses to the environment and climate. In design, I seek to minimise harm to the natural environment in all aspects and seek to find opportunities to have the project contribute to ecological healing. Humans evolved in the natural world, and my work seeks to engage people with the natural world through indoor-outdoor connection, mediated through transitional spaces, and through the process of “sailing” the building to the climate. Materials are selected for serviceability and durability. Durable materials are vital as 1/3 of the cost of a building is in the labour, therefore, cheap materials are a poor investment and a waste of materials, energy (embodied, etc.) and effort (labour).

6. Initially, attaining a good, workable brief with the client, then designing a concept that matches the requirements to the characteristics of the site, its location and its surroundings. Then, with the client, re-evaluating the brief, augmenting it as necessary and, in the process judging whether the concept is comprehensive and flexible enough to form the basis of refinement of the design. A lot of experience is very helpful in undertaking the initial work. Because there is a lot of intuition involved in all aspects including asking the right questions to establish the brief, reading beyond what you are told, designing a concept that works extremely well and also has the potential not only for development into good, appropriate architecture but that also has the capacity, if appropriate, to be changed and augmented with the efflux of time.

7. To bring together the client brief, site context, budget, buildability and explain the opportunities / constraints of the design as simply as possible.
Not important because it is often difficult to compare my emotive response to that of others, i.e., end users.

Design is all about recognizing people, so of course it is emotive. Only the most insensitive designers would fail to consider the emotive (psychological) aspects of their work.

It is very important. This is a major aspect that informs all my designing. It is probably more important than function. For if a design can evoke a particular emotion in a person, for example relaxation, then when designing an unusual drawer that does not open in a way that is familiar to a person, BUT if it has that person feel relaxed then I will design the drawer in that unusual fashion regardless of function. I believe that interior design is about manipulating built environment to cause new worlds for people that play with human emotion and reactions.

It is always our intention to design to create an environment that the client, builder and others that interact with the building are pleased with. the result and excited about living and working in the spaces. For example clients love it when someone walks in off the street and makes an offer to buy their house. This is a compliment to the client and an encouragement that what they have participated in is successful.

Emotive qualities add value to a project. They influence the building by concept of how they use the spaces in and around the building.

Emotive yes in the terms of designing as if people mattered not this is a this is a very beautiful building. "The architect was a self made man who worshiped his creator!"

This is the emotive point in the process - it may not be declared publicly but it may well be declared privately and inwardly - and it is the passion from this stage that enables the designer to sell the concept to a client - it is from this point that the design either believes in the project or doesn’t.

What is emotive? (See Eikhardt Tolle: "The Power of Now", "A New Earth") If you mean a feeling, like love or anger, or sadness, or warmth, or regret, not hatred. I am not sure that any but love make their way into the world. I do experience exhilaration when I hit on an answer to a design situation (The word “problem” is too negative – it is not a “problem” it is an “opportunity”). If the evolving solution is viable, it will usually generate positive feelings of confidence and excitement and joy. That is part of the “high” of design. This does not diminish if one gets to working drawings, because all the time one is "discovering" more about the nature of the design and exploring higher and higher levels of resolution. As always the challenge is to stay alive in the
3.6 What facilitates the imagined experience, what contributes to it?

- Intuition: trust in self, confidence, keen ear.
- Past experience, previous knowledge.
- Visual + visual communication, visual triggers.
- Consideration, awareness of user, use of mental imaging.
- Visual + mental triggers, expressive memory, images.

Meanings: Intuition, Activations.

Activities: Meanings, Visual stimulation.

Meanings: Visual stimulation, Intuition.

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APPENDIX F: EXAMPLES OF PRIMARY DATA COLLECTION – CODING
APPENDIX G: EXAMPLES OF PRIMARY DATA COLLECTION – BUILDING THEORY
Feedback from designers suggests that design activity is inherently both creative and pragmatic in nature. In the both, internal (imagining) and external assist in both the exploration and resolution.

Design is essentially processes as well as activities which are fundamentally strategic.
Emotive qualities are important to consider as part of the design as:

1. Emotive elements inform the design.
2. Create a response from the users of the space.
3. Add ‘value’ to a space.

Emotive aspects are perceptual, which assists the internal because external through a process of internal exploration.

Informs the design → reaction/response

Change perception of a space
- allow for positive experience
- permit greater engagement
- create a message in the space

Add Value

Related to internal processes but to overall design activity.

Conceptual map showing imagining as related to the processes of design - in particular to internal processes.
- Imagining is assisted by:
  1. The client/designer relationship
  2. Experience in designing
  3. The ability to focus on the task at hand
  4. Triggers: mental + physical

- Visual, auditory, sensory

- Contributors

- Imagining process

- Imagining experience

- Client relationship
  - Knowledge of project
    - Designing experience
      - Intuition
      - Imagination
      - Usability
        - "Mental clarity"
        - Lack of distraction

- Triggers
  - Physical
  - Mental
APPENDIX H: EXAMPLES OF PRIMARY DATA COLLECTION – THE INTERVIEW (STAGE 2) TRANSCRIPTS, MEMOING NOTES AND CODING
I: Now basically the interview today is about the cognitive aspects of designing. So in some ways it's about the imaging aspect of design, and I'm probably familiar with the design process and academic sort of speaking. But as far as my, up until now representing, I was asked... anyway I'll explain my research further down the track because I don't want to mar your responses. I have a series of questions here, obviously some of the questions you'll answer by answering other questions so we'll just go as we go.
R: Sure.
I: Okay, Doug, can I just get a brief overview of your designing experience, or your design life I suppose?
R: Yeah well in my younger days I was a design architect and I would do design (?) and at one firm I did a lot of, all the presentations as well. But these days I normally run projects on site which requires, I do a lot of freehand sketching for detailing and sorting out problems. I'm usually given a job that someone's stuffed up and get to get it back on track. So... these days I don't do much design but it's more making the building work in terms of the design architect's intent and so I'm normally if I come up with to solve the problem, I then sit down with the design architect and say this is the way I think we should handle this and he'll say oh... no, can we do that and I'll say well I'll have to investigate whether I can do that. So that's my sort of role these days.
I: Okay. Um, and you've been working for quite some time as an architect?
R: I've been a registered architect since 1975.
I: Just a couple of years then. [laughs] Can I just ask you what your process of design is? Is it from conceptualisation to the schematic stages?
R: Well I suppose I was brought up, when I went through QUT it was focused on the function and that's the approach I've always taken whereas I get a bit troubled by some of the younger architects now, they look at the form that's what you know, sort of see it in a magazine and modify it a bit and then they try and make the building work, to that end and I just don't agree with that. I like to make. If I'm designing now I'd be working at trying to get the climate right and getting the planning right and before I went into how a building is going to work but that's not happening so much.
I: May I ask, as an aside, why you thought that hasn't happened?
R: Um, because people are going for a look and I've seen to some buildings lately and they're just hollow. They've got large areas of glass facing the west and it might look spectacular in terms of the drawing and 3D's and looks good on the outside, but you go into one of those rooms and I don't know how anyone can live there with air—
I: So the creative qualities of a space are important to you?
R: Extremely, and the functionality. It works with climate. I went into a building, I've got a friend who lives in a building my friend was the architect for and she was (Glen?) at New Farm and it's a long standing building. And my friend who lives in there says that in winter she doesn't need heating and in summer she doesn't need cooling. And that's because it's properly orientated for climate and it's basically only one unit deep, the access is an open balcony on the back, on the southern side but she can get the cross wind and ventilation and in summer it's cool. And we've lost all of this and especially now that we're you know, we're wanting to do buildings that are not draining out resources, we've got to get back to first principles in terms of climate and how to minimise energy usage.
I: Absolutely.
R: And orientation, function is as important as form
R: Um, well, the site as I said is extremely important. So you make sure that I visit the site, you know, you understand it, you know... contextual issues, topography, climate, you know... overland water flow issues, whatever. Spend a lot of time immersing myself into the site and understanding, you know, trying to pick up the little nuances of the site, sound, all of those. Of standard norm.

I: Do you see anything on the site when you've got may be perhaps, you might have an image in your mind of what you might be creating? Do you actually see...

R: I do, I don't see necessarily a form. Sometimes I do, I guess but I very, quickly um... I guess in identifying basic things like north and when I look, protect yourself from a horrible apartment building on the other side, you know you can very quickly put together an understanding of the program. So yes and yes I guess, to that.

I: Okay. And then you move on to, you move from the site, you analyse the site and you're sitting down and you're actually starting the design. Can you explain to me what goes on mentally and how, and the translate of the mental to the physical. Can you talk to me about that?

R: Mental to the physical. Um... yeah that's an interesting one it's always hard to describe one's process isn't it. Um, well I guess... pause. I guess after visiting the site, obviously when you come back to the office or your studio or whatever, there's still another series of series, steps that have to go through as you know, plugging in all the other various parameters, budget, the brief, materials, blah, blah, blah. When I sit down and start designing, um, again I guess it depends on the project because it was a base, um, as opposed to, I'm trying to think of another model, a building, obviously the approach is slightly different um... I guess it's a start, a series of diagrams because as I said that's where my drafty background comes in I start understanding the site in terms of programs. Again informed by site analysis. I don't necessarily I guess you're trying to imagine a building, how um... probably at uni, I did. I was very much, you know this is what it's going to look like. I'm trying to break away from that. I'm trying to allow I guess, allow other things to influence my design process and um... QUIT when we went through was very much about um, developing buildings as objects. We weren't really taught how to think about it all, we were never encouraged to understand a building as a series of experiences. Um, unlike what I guess happens at other universities. Um, which again as I say, Ben and I had this discussion yesterday.

We both agreed that that is one of the seriously limiting aspects of our architectural education. From what I used to be very much object driven, I probably, still am more that say Ben is but I'm trying to break away from this and start thinking about the building as a series of experiences. Thresholds or whatever but it's probably only really since I started doing my own research and teaching, been doing a lot of thinking that I sort of started thinking about the building as a series of bits that come together as opposed to an aesthetic object.

I: Do you, you're talking about this, series of experiences, do you see anything in your mind eye when you start putting it onto paper? Do you see these experiences?

R: I do in terms of ways. You know whether you want something that's abstract or the interior, exterior. Yeah, yeah I guess I do.

I: Can you talk to me a bit more about that?

Laugh.

R: Um, I mean it's pretty much that I see in my mind a series of spaces that are connected and try to explore the possibilities of those connections and I just mentioned threshold. I was lucky enough to go to Joan Stone's house and really, that blew my mind in terms of thinking of um, a house as a series of thresholds, rooms becoming thresholds to the next and leading on and on and on so I guess I am continually trying to improve my own, and I am trying to teach myself but I'm probably not answering your question.
I: Was that a cyclical thing? What you draw here and then the, what you draw begins to feed more information back?

R: Yes, yeah, yeah. And but then you, as I said you've got to start to use the scale rule and get it, get the sizes to work and then you have to rethink it again.

I: Okay. What about when you were actually designing? You're there, absorbed in the task. Can you talk to me a little bit about that?

R: Used to walk around in circles. It's like... a lot of my family members are artists and initially when I was designing, it's like a white to break through and into the ( ) and preconceive my family members who were actually artists, they have the same problem and they don't understand what it is but once you sit down and start to get into it, it starts to really flow and you're wondering why you didn't settle yourself down and get into that mode a day earlier.

I: Ah, okay. Can you talk to me about that flow and getting into it? What's the experience?

R: Just trying to think... sometimes to really get something into a design, it could take a number of days and then suddenly it starts to flow and it's working and you think, why couldn't I have come to this conclusion a week earlier, why has it taken me so long and it was so simple!

I: Yeah.

R: So I don't know how to explain any more than that, it's...

I: Is there some sort of other activity, could you say it was immersive, the activity?

R: Yeah, yeah I mean you'd be totally... I'd be lying in bed thinking about it at night, I'd be... well you'd know, I commute from Buderim to here every day, people say well what do you do in that time, well usually I'm thinking about what I've got to do and how I can do it and if I've got to design something and even if it was a technical thing I'm thinking of all the different ways I could approach it.

I: Are you in those spaces in your minds eye?

R: Yeah, well not so much when I'm driving.

I: Laugh, I hope not.

R: But yes... yes.

I: Okay. Can you explain a little bit about that?

R: Hmm... yeah I suppose I've got fairly good visualisation skills and I would, yeah I'd just... live it in my head for a while like I'd... change the subject slightly. I was involved in motor racing for ten years and I was a body builder and an engineer. So... I've got to see these things in my mind.

I: I see, when you think about these things you close your eyes and...?

R: Yeah, you're living it in your head. You're seeing it.

I: Do you test these spaces using that visualisation?

R: I think so. I don't know because it's too there. I've never sat down and think too much about what to do.

I: Could you say it's similar to any other activity that you might do? For example reading a book or watching a movie?

R: No but it's similar, I was involved in sailing races for eighteen years and... I think if I would ah... there was some technical issues and I would live it in my mind and then before I'd go out and sail and I'd try to run through every rule and how the boat was in this position how to make use of the rule because I was a tacsician so I had to be able to live it in my mind before I did it. If I couldn't live it in my mind beforehand I wouldn't be able to do it in the water.

This problem is incredibly cognitively dependent and solves problems through a cognitive process (mind's eye) rather than through a physical process.
So the kind of architecture is not about its design, or all the documentation and its administration is about the entire set of making a building. It's about making a building from beginning to end. And yeah, so that's how we are, so it's that kind of shift on that other model of place where there are designers and there are those who aren't designers. This said, both, everybody and nobody is a designer.

I: Which is good, it's good.

R: Yeah.

I: It sure beats some practices where you are documenting for a long, long time and it's only when you're really, really special you get into the design, so... so which is good. Okay well you've got the questions there do you, basically what's your process in these conceptualisation and schematic stages?

R: So I guess, I guess what we try to do is... there's so many ways I could answer this, just umm, bear with me. Some... I guess one of the ways that we try to do it in our office is that... it's been said of our office that there's no sort of house style for what a word is. The basic premise in our practice is that there are a whole bunch of people who work in the office and a whole bunch of projects flowing around it and all of these projects have latent dissonancy and each of the people in our office have their own idiosyncrasies and so we... we guess try to do is identify within each project those idiosyncrasies that pertain to the architect coming along to the project and then understand it by being constructively critical or supportive of certain... in that, just how we want to manage the pre-existing condition and how it might interface between itself and us as individuals. And while still this sounds incredibly obvious I think once it becomes kind of a stated thing, what it does is puts a whole new light on the importance of structuring architectural relationships because in our experience I think both relationships within the office as well as relationships between members of our office and with the client, the things that actually are the main stay of making architecture.

So the relationship is an important aspect of that?

R: Yeah and the only way I think you can do that is by you know, very truthful and transparent ways of saying there are the things about your brief that might we subscribe to but you also need to work with and so on, you identify areas of common concern and overlap (?) of viable and kind of what legitimate relationship and a... it's not like it's a genuine transaction or some sort of business transaction or a thing where the architects have been engaged in the way they were told to do. And yeah so that... it does come down to that thing about fostering a relationship so that a piece of architecture can come out the other end on. Okay, when the client comes to see you, like a client's come to see you, is there anything that you know, when you talk to them and maybe during the process of talking to them or following that, is there anything that occurs in your mind, do you see any sort of image in your mind? Do you start building things that you think might...?
APPENDIX I: EXAMPLES OF PRIMARY DATA COLLECTION – ONE COMPLETE INTERVIEW (STAGE 2) TRANSCRIPT, MEMOING NOTES AND CODING
I: Okay, so, what I'm going to start off with is actually ask you, get you to tell me a little bit about your designing experience or your architecture experience and how long you've been doing it and just brief overview, yeah?
R: Okay so I came straight out of school and went and did architecture at QUT. Some would say that wasn't very advisable thing to do, I mean going straight from school like, not going to QUT. Laughter. And went straight through the course, six years, did three years full time and three years part time, as it was structured back then. Started work in the fourth year, got a job at Lindsay and Kerry Claire's office up the Sunshine Coast, that was great. Commuted back and forth while I was studying down here, working up there, it was a fantastic experience. Lived by myself while I was up there and just got stuck right in and I think that was when things really started to make sense from the design point of view. Wasn't so much that the way that Lindsay and Kerry worked was so design focussed, it was actually entirely pragmatic when you get involved in it and see how it worked. It was a totally pragmatic process that they had but it was just seeing how architecture is really done outside a studio environment that really pushed things along well. What happened then? I got married, came back to Brisbane, took a job at a commercial firm as part of my strategy of covering a whole lot of boxes and ways of working. No I didn't take a job at a commercial... in fact I got a job at a council, at the architectural design group there, worked on a lot of great things. Libraries and some public toilets and Newfarm Powerhouse was the best project there. And so back then Peter already had a policy, he was running the show, that once you can have a job you can get... they always had a student and once you're no longer a student you no longer have a job. So... and that's fine, that's good because you... he was really of the view that if you stick around you get absorbed into the system and it's not (healthy) for you. So as soon as I finished studying I thought, well I'd better go and get myself a job, so I got a job at a commercial firm just so I'd have just sort of small practice, government sort of practice, commercial practice, a bit of (?) sort of thing and ended up working at Bill and (Travis?) which was fantastic. And finally I had enough money, little projects, friends kind of waiting go, so I thought, well I'd just go and do that, I'll take a big pay cut and I'll go and see how it works. Here we are four years later. Laughs
I: Oh wow, okay. Walk to go
R: Still living by the seat of our pants. Laughs
I: That's the way to go I suppose
R: Yeah that's how we tell so umm... yeah, did that... is that what you're wanting?
I: Yeah, yeah, I think it gives us a little bit of a basis of you know, where you're sort of situated in practice and how long you've been doing it and... okay,.....
R: And I came...... when I started study it was '93, just for the record.
I: Yeah, yeah okay a little while ago.
R: A little while ago.
I: Good, what's your process of designing, the conceptualisation and the schematic stages?
R: It's really, it's quite quick. I find I don't ever... you do come to a project or to any design problem with a sense of a set of strategies in mind and I think, the other night I was talking about this as being like having a pantry or a wardrobe full of kind of same big things you know, and a whole bunch of small things. So there's some big, say you know, you might have, if you've got a few great suits and you accessorise them with... and that or you've got some... you know, you've got some great pasta and you
just involve lots of different conditions. So you've got a few big strategies that you like to use and that are pretty flexible and applicable, and then they work well with a bunch of other things that you can choose from and assemble a kind of a way of dealing with the design problem. So even though there are programmed into you as just — through following your own kind of inclination, I try to make that so prescriptive you keep a few that you don't have to use all the time. There's some flexibility for being specific to new clients obviously to start with and the site primarily and obviously budget as well. So if you get those, if you get that sort of stuff together then you start thinking about, it sorts of sets the context of what the problem is and how you're going to manage it. So that's kind of how you start. How it goes on from there, it's entirely unplanned, it's entirely unmethodical, that's a bit of a confession for you, usually I find that you only start making any sense out of what it is that you are designing when you go to the site or the location and you spend as much time as you can where the building is going to exist and thinking about you know, the client brief and budget stuff. How that all fits in with that and also your responsibility to a community at large. You know, here's your location, yes you've got these individual requirements that your client has — I remember going — hearing unfur — the architectural conference in Melbourne, Angella Caruella was talking about how, I don't know whether he tells his clients this, but he has an approach that the building is going to be around a lot longer than the client will. Laughter. So he sort of — asked his clients to understand that he was going to place the necessities — the needs of the building ahead of the needs of the client. Although these needs are still very important, so you sort of, you obviously understand that you have a responsibility, that you're making a building which is one of the most complex things you can do short of kind of going to the moon and kind of earning career and things like that. And there's a lot of obligations that goes with that as you've got to begin that project in your mind at the same time and I usually find that I kind of just go away from that and really don't even think about it for days, weeks, whatever. I don't even consider it. I go back and I keep on working on whatever we were doing before just muck around, go to the — read all kinds of strange sort of books, surf the web and just do whatever happens and there just sort of filter out in the background and usually you've got an initial impression that sort of, that guides things. It's like, I don't know about you, but an analogy that sometimes use is that sometimes I go out for a walk at lunch and I'll walk, even though I'm basically I'm just going out for a walk, in the background there's an album I want to buy or there's something I want to do or someone I want to go and talk to and so even though I haven't consciously set that as the objective, eventually I will end up at the record shop or I will end up at the cafe or you know, whatever. So, it even though you haven't really set out in this design thinking process to get to a point, there's your initial impression that you just get outside that's guiding the subsequent kind of considering what it is. So you kind of end up to a degree where you thought you would sort of other things have kind of fallen into place and sort of shaken out in a sensible way that's understandable by the time you get there.

Q: Okay, is it something that you visualise on site in that you know…… R: Often it is and it starts, generally it starts off in a very abstract way. It's more kind of…… it might just be…… it might be a mental sensation but you know, to use this image would be really appropriate here, or to use steel would be really appropriate here of you want to create an experience of being protected by something that's really heavy or sitting on top of something that's quite light or offers a view. It's really driven by a kind of an experiential, you know, I read a lot of Peter Cookson kind of books off the time and he's it's primarily about atmosphere. It's really, what kind of experience is appropriate for the site or location and how did it integrate into a street and how is that street organised, so how can this building present itself in that context as you know.
Architecture speaks for itself.

what it wants to be. So these are the, there’s all those different ways that you respond to a different site that you can apply in a brief and a budget so whatever is guiding this particular thing, there’s usually one strong issue that’s at stake that kind of, the other things all sort of follow behind that.

R: Yeah, the rest of it. Yeah.

I: Yeah.

I: Do you visualize the building on site?

R: Sorry, that was the previous question. I don’t.

I: No?

R: I don’t. I really don’t. I guess because the kind of appearance of the building is not really the primary concern of the work that we do which is controversial to say as an architect. But really I think the emphasis is placed on how things look is leaving out a whole range of other senses that are equally important. The really sort of flavour of the predominant medium and consumption of architecture which is got to go to print media, web media, two dimensional. Most people never get to see, never get to experience great back yard renovations or great public buildings around the world because you just, you can’t get there. It’s private property or you can’t see it if you can’t access that. I have these things that are very much the success or not of a building is judged by how it looks in image terms and I used, I think that’s a really superficial way to treat architecture and it’s,

R: Taking it… you’ve got to take it to another level with the other things, is that what you’re saying?

I: Yeah okay. So when you get down, so you’ve been to the site, spoken with the client, been to the site, mulled over it a little, and you start designing… talk to me about that.

R: How can it… it on different scales it’s different things. Like with light here for instance that’s on the wall. With that, the design process of that involves I knew I need a light to put on the wall there because (?), there because this was dark and I didn’t have any money and so getting something, getting some… getting some fitting from a light supplier wasn’t an option and I was working with the kind of the folding of metal which is something we still like, and I was doing all these drawings and none of them made any sense and they all looked kind of chunky somehow. So and I was sitting up at the house before going in to tutor some students and I just thought, that’s it, it’s getting me nowhere so I just ripped a piece of paper out of my book and just started folding it. And eventually, not even eventually, really quickly actually came up with that. Basically it’s sort of A4 page scale. So the design process of that was sort of realizing that there was a fold in metal that I’d been wrong not to design something wasn’t the correct medium for what the thing was. Folded it, worked better, suits my lifestyle, you knew, that I work with metal? You make this and a week later it doesn’t start and so that was the design process. For there are all sorts of strange design processes. For the building that we did at Robertson Street, that was really, that was a really structured process because the client had in mind for him a very logically organized kind of business plan or sort of commercial image of what the dental practice was going to be. And we had to work very tightly around in relation with some graphic designers who were doing her branding and that kind of stuff. So a lot of the decisions were sort of based around some discussions that she had with some other people at a length, before we even got there. So a lot of it was just really simple kind of bubble diagramming and really considering how to make the most out of the the sandwich of low ceilinged concrete space. And that was another thing, spend some time on site, you realize that once you’ve walked ten metres into a building, it’s just pitch black because...
there’s no day light, so you get upstairs, there’s a saw toothed roof. So if you cut a big hole in the floor in the middle of that plan you can actually watch that natural light flooding in to light the space. And it’s a gesture that’s just a reasonable thing to do and it works really well and everything like that. So that was one of those things where it wasn’t sitting down, sitting down to draw, but I find it more about it’s in your communicating an idea to somebody else. It’s a lot of that kind of sitting down to draw stuff. It was sort of as a kind of a seeing exercise, but usually for me, primarily about getting whatever’s floating around in the mind onto the page so that I can talk about it to somebody else. Very little of it is me, I think is that I sit there with nothing in mind and just start drawing. I rarely ever have it sit down with a blank sheet and think what am I going to do now, laughter. It’s really sort of getting things on the page.

R: So there’s a connection between the image that you see in your head and what comes out.

I: Absolutely, yeah

R: Of people?

I: Yeah, do you, when you’re doing that process are you aware of others around you or...

R: Of people?

I: Yes or other things around you?

R: Yeah, I do, it’s a strange combination of getting absorbed in certain... of what you’re doing here but it’s also you are always. You do have all your senses turned on all the time and you kind of are always aware of what’s going on and a lot of it is...it’s very difficult to design anything else when you’re surrounded by a certain client and talking people and lots of music and things like that. You’re always aware that they’re there but it isn’t so sort of to talk... you know you can sort of... you can... you can turn the volume down and all that but you can direct your attention to the page here but you still know what’s happening around you. But you can’t really design something and maintain a conversation at the same time.

R: So I don’t know if other people can but I certainly can’t... like to just focus on one task and have everything else happening in the back ground and only give them any attention if they need it.

I: Okay. Could you sort of describe what’s in your mind’s eye when you’re actually doing it? What’s in... you’ve mentioned that you’re able to turn the volume down as a not a physical thing but as a mental thing. Obviously there’s something that’s going on in your mind at that point, can you describe that immersiveness?

R: Yeah it’s the idea, you know when you’re daydreaming and if you try to daydream you can’t do it but somehow when you sit there and you’re thinking about your memories or something of whatever and somehow, don’t you find that your vision almost turns off?

I: Yeah

R: And you can see that tree you’re sitting under or you can remember that time you were at that dance party and you heard this great music and you can see it and your vision somehow turns off. I don’t know how it works. And somehow you just know, just come back into the room at some point and I don’t know how it works. I find that fascinating.

I: That’s what happens when you design?

R: Well......
R. Sort of. It's just that when I'm working on a piece of writing, I find that I'm quite deliberate about the way I approach it. I think about the story or the character and the themes I want to explore. And then I'll start writing, but I'll usually start with a rough outline or idea of what I want to say. And then I'll keep going, but I'll keep going back and forth to make sure that everything makes sense and that the story flows properly.

M. I see. So you prefer to write in a certain way to ensure everything fits together.

R. Yes, I think it's important to have a clear idea of what you want to say before you start writing, but you also have to be willing to change your mind as you go. And I think that's where the fun comes in. You never really know what's going to happen until you start writing, and you have to be willing to take risks and try new things.

M. It sounds like you really enjoy the process of writing.

R. I do. I think it's a great way to express yourself and to explore your own ideas and thoughts. And it's also a great way to connect with other people and to share your ideas with them.

M. That sounds really interesting. Thank you for sharing that with me.
I: Absolutely
R: Yes, it does. Without the mental block of imagery, you can turn it on to its full richness.
I: So you don’t get that real肉/brain being with being in the space when you create it or not?
R: Well I think the more you can do that when you’re imagining, when you’re doing your design work, then the more real and the more precise and clear that end product is. And you can see it with a lot of buildings around town. You can see where people have actually got it right into something they’re doing and they’ve really understood what it feels like to stand on that floor and how the breeze is going to come through that window and how the ceiling height is going to affect the feeling of sort of personal size and scale relationship. And whereas there are other buildings that are clearly being primarily designed on a computer screen, like someone is looking at something that’s in front of them and dealing with using....dealing with images that are pretty much referring to something that they’ve seen in a magazine previously or, an ideal that architectural fashion or making it. So it comes out just feeling a bit shallow too and...you know.
I: Can you describe one...
R: Of those buildings? Laughter
I: ...no, no, I don’t think I will. I don’t think we’ll ask that, oh no. No can YOU describe a time that that has happened to you where you’ve actually been in the space while you’re designing it as well?
R: Yeah, well we did, I like to think that it’s more times, maybe that’s not true, I don’t know. But the little house we did in Canberra, which was our very first project that we ever got on site, took a bit longer than that to finish, was one of those projects where it wasn’t at all about form, it was primarily about space and materials and so on. And light fell inside it was one of those projects where and because it was for the family, and I was very sort of intimately connected with it. I really...it was my father and his partner and I wanted it to be magnificient but that was...and even though they didn’t necessarily have the objective of magnificence, they really sort of wanted to take a north point, corner and carve out a laundry and a toilet and make it usable. I really, you know, feel like your own your parents a bit and you don’t really wanted to make this thing that was just a delight for them because they are beautiful people, they love to read and drink wine in the afternoon and have great lunches and so on......
I: Yeah (?)
R: Yeah and I know that they would really enjoy this if I could just make it right, so I spent a lot of time considering what the materials were and how it would orient it towards the Andrew which is over there and how the sun would come across at different times of the year. And I could do a lot of total kind of testing of that in computer and simulations but a lot of it was really about you, really just being present. There are these imaging, Recycled timber, what it feels like and how the glass feels when it’s really cold outside and it’s warm inside and things like that. And having, and gone there and seen it finished it’s just...it’s you walk in to the space and there’s just no surprises. You kind of, you’re already been there and it’s just taken time to get sort of come into existence.
I: So you’ve already been there...?
R: In my mind.
I: In your mind?
R: Yeah
I: So what you’d envisaged in your mind’s eye was the same as what......
R: As what it is in reality.
I: Oh okay
R: So there’s a... and I usually find with most of the projects that I work on that I don’t get these problems when I go there because I do imagine it all and I think there are times when for one reason or another you’re mental imaging of something isn’t as rich as you would have liked it to be but sort of time constraints or other distractions or whatever... but usually I’ve found that, that I do get things in things in that depth and the only time that you don’t really have when you’re looking something that you really don’t understand, you’re seeing a process that you’ve never used before and so material and that’s also fun. So these are the surprises... I guess you know, if you’re doing architecture properly you do have the ability to imagine what it is you’re making... and it’s made like with the molded mades... I... and... and you sort of the material would... because of surface tension would actually curve... rather than just fold and exactly just what its textural quality would be because we specified a material that we’d seen a very small sample of, that’s all that they would provide us with. So it was kind of here’s a material, it should be good, it’s going to blend I think... and these are the sizes it comes in so we’ll do our own shop drawings and if we fold it this way it should look kind of crumpled and fingers crossed... and so it’s one of those things where you really, you know, well I’ve... it’s not all these times before so I should really get it right again. And if I don’t well, I’ll try my way out of it and (??). And so you, I do take a few risks in that regard where you sort of think... well look, I’m just going to back myself to get this right. I can’t really imagine how it’s going to be because I just don’t know, it’s beyond anything that I’ve kind of dealt with before so... and unless you’ve got a client and knowledge to build a prototype and test it, which I know a lot of the best architects in the world do and when things get one to one scale prototype, builds those things all the time and... but unless you can do that, then something’s new and you haven’t dealt with and therefore you can’t really imagine it, you’ve kind of just got to... I: Go with it.

R: Go with it, back yourself.

I: When you mentioned that being I guess, being in that space but not actually having been there before did you see others in the space or any activity occurring within that space when you were imagining it in your mind’s eye?

R: Absolutely.

I: Yeah?

R: You do imagine yourself there, but I’d be... often... often it is... because... it’s funny but I guess it’s impossible to detach yourself from something that you’re imagining because you know, yourself is the core of everything that you understand, but it’s primarily, as an architect, unless you’re doing buildings for yourself or that you are doing for other people so you imagine your father and his partner sitting there, drinking wine and having a chat, are the doors open... now it’s summer and everything and it’s kind of breezy... or is it all closed down and the fire’s on and it’s winter or is it in the morning and they’re having breakfast or... so to really imagine how other people are going to and you kind of create a way that people are going to enjoy the spaces that you make and you hope that they will. I try to as a... and one of the things I was saying about the other week was I try not to lack that down too much though as to how they’d actually enjoy it, I think there are some architects around that really, really clamp down on the potential of the space. And yeah, it can be truly rich... but the richness of that can only be discovered by living in it, so it’s a rich space and it has to be experienced this way. Whereas you can make something that’s a bit more... allows for people who...

I: Flexibility

R: To experience life in a different way that you do and because not everybody gets the same enjoyment out of the same things and... so it’s nice to be able to think well...
look, I think this is wonderful but I really don’t expect everybody to sit on that ledge.
and look at that view and feel the same way. I do all the time. So I think a lot of it is
making things that are particular and make things that are also very effective enough
that people can bring their own imaginations and their own history and their own daydreams
and sort of apply them to the same structure.

I: Do you, when you’re doing this and you’re in there, do you feel temperature or see
colours and lights?

R: Absolutely. I always dream in full colour (7) that, and in very, strange,
strange ways. I had a very weird dream the other night about a sort of strange Gothic
house, and its all sorts of weird bits of metal work, anyway we’re not going to talk about
that. I think the colour always, always temperature is so important
because architecture is really about taking the natural environment and shaping it to
human advantage. Really that’s what we do so to customise it to human advantage
you’ve got to be taking the situation and improving it somehow. So therefore, physical
comfort as one of the key issues, you can make the natural environment so
thinking how the breeze is going to feel across the hair on your arm and how the
sun on your back is going to feel on a winter morning and that sort of stuff is key to this
sort of stuff. And sort of imagining the sun on your back on a winter’s morning is that
sort of golden radiance and you know, how it’s going to discolor the floor over time
and how that image is going to fade and that kind of stuff. I think you can imagine all
that sort of...

I: I guess so. you’ve already answered my question as such. Well a couple of them,
whether you perceive yourself to be in that space and for you to consider the feelings
and the evocative qualities of the space when you’re designing, obviously that’s
something that’s important to you.

R: Yeah, more important than anything really.

I: I wonder, going back to when you were, you said that you were, you could see that
space, you were doing it, you were in that space before it was actually built. Can you
describe a little more of your process? Like when you were there, can you describe how
much you were there? Was it like watching a movie there, whether you were engaging
with the outdoor or again reading that back where you smell it or were you that grey
colour there?

R: Yeah, interesting question and it really develops through the course of the project
you’re dealing with and to start with usually it’s... it’s... it’s really difficult to build up
a rich image straight away, you really, you kind of just get little snippets, you know,
about a physical relationship with your surroundings or a kind of a sense of
something like that. So it does start out very grey usually, and it takes time to build that
up by considering what the material is and how it’s organised and that kind of stuff.
And it’s only once you’ve applied your knowledge, a lot of thinking to it and a lot of that
done in the background subconsciously, you’re not even considering it. That really is
building up to something that you can visualise and you can really have it in your mind.
But to start with it’s often just a series, like a dream, you know, it’s really, the kind of
disconnected kind of snippets of kind of story line that you’re kind of trying to piece
together into a whole that is meaningful and solid and deep.

I: What’s that... what’s your feeling, what’s your experience when you’ve seen that in
your mind’s eye and you go there and you experience it for real? Talk to me a little
about how that must feel.

R: It’s a good question and it’s either very satisfying because you imagine something as
being really superb and it is and that’s immensely exciting or it’s immensely
better. I learned on another project was imagining something as being really great in a
kind of architectural formalised way and you get there and it is, it looks sensational but
and it doesn’t feel good. So even though it is exactly as you imagined it you realised...
I: Okay, finally, do you have any other comments regarding you know, this kind of mind's eye imagining and all the rest of it, do you have any last comments on that?

R: I think it's a fascinating topic of discussion. I... it's something that I have a think about from time to time and a lot of people ask you as an architect you know, can you imagine buildings before they're done, can you see them, can you turn them around in your mind? All those kind of kind of comments, you know, can you take the wine glass and spin it you know, it's like yeah, yeah, I can do all that and it's you know... even imagine the wine falling out of it. And so there's a lot of kind of you know, generic ideas about what that is, but when you're really... I love sitting back and thinking about it, what is a daydream and what is a mental image... I find it just immensely intriguing... intriguing is the right word. Intriguing literally is you know, an intriguing, interesting is the correct word. It's... it's, it's a series of electrical, chemical things happening in this blog inside your head. How can you see it, how can you hear it? how does it form this 3 dimensional union you have? I don't know how it works, I don't think anybody knows how it works and that's why it's so fascinating. I spend a lot of time thinking about things that I don't understand, reality itself I don't understand that. Laughter

I: Who does?

R: So... and I think and for me the interesting thing is making those things that you don't understand the basis of what you do. It means you've always got something to... some unknown to step into and something to deal with. If you're always departing from knowns you're never really going very far, you know, so, yeah. So I think it's a fascinating course of research and I too will be very keen to see where it leads you.

I: Good, on the... we've been sort of... I'll end it but I'll leave it running... but it's interesting when you're talking about, you're wanting to know what is that where you are there and you're talking about the book, that's called literary presence, where you're actual presence is the actual feeling of being immersed in another world and there are different sorts of presence. And that's what my research is, it's talking that sense of presence to imaging but imaging as it's been talked about it tends to be a design process that imaging sort of occurs here and it's sort of... 

R: And it's left behind.

I: And it's left behind. I guess I'm trying to look at, perhaps presence actually takes this further and links it to all parts of the project.

R: Yeah, it's got to be there the whole way, if you let it slip at any time you're gone, you really are. It's absolutely got to be right end process, it's got to be there all the way through. Even when you're talking to the builders on site, and you've got to get them on board and you've got to get them imagining, you've got to tell them the story and say
experience of space
spatial equality

I: Do they work with you more then?
R: They work with you more. If you...you get them engaged in what it is that you are making. If all they're doing is making some shapes off a plan they just put up on the wall and they're away and...laugh and whereas if they believe in the story of what it is and you've allowed them to get that image of what it is and it's not easy to do and it doesn't always work but you always get a better outcome.

R: Yeah, yeah, yeah.

I: I thought...but really it has to stay there and even as an architect, like if you're drawing a detail of a window ledge or a kitchen bench or whatever and you're not in the building that you're making then you're just...all you're doing is just...

R: Objectifying.
I: I think...it's just doing a drawing. It's just lines on a screen or a page or whatever. It's not you're not making anything...

R: You're not making anything.

I: Do you...a couple of comments that have come back so far seem to be that it's got something to do...how you engage with the project has got something to do with the client or the project, would you say that's the same for you?
R: How...in terms of what degree your engagement is?

I: Yeah.
R: I think so, well it's...architectural practice is a way of feeding your family

I: Most architects.
R: Yeah but for most of us, some of us it's just a hobby, and that's great, that's a luxurious position to be in but if it is a way of feeding your family then there's a balance...if commercial decisions you make as to the projects that you do and you...and sometimes you'll do them in a way that just executes that professional requirement and that's where you get a whole lot of day architecture from and I think the majority of buildings that are made are made that way. And you get some where you think, well this client is really...really wants something great and they're not going to stop that from happening. It reminds me of...you know you've got a good woman, based on Lady (?).

Oscar Wilde's book, it was a great film and there was...it was a great point. And basically he just took off with the wild quotes out of the previous books and there's one where...some of the chaps, all the chaps sitting around here and he says, oh, you know, woman, it's a broad idea, they share us to greatness and yet somehow prevent us from achieving it. [laughs]. Sometimes you have clients like that, you know, that they...kind of they really, they're all about this great building and they want it to happen and get in the way of all the way there. And so it's never just you that...and this is something that I remember at that architect's conference in Melbourne that Titil Mill was looking at and it was all about trying to debunk this idea that architect's grand visor, several years later, fantastic building, like it just doesn't happen that way. So there's a lot of things that your level of engagement with the project does greatly depend on the client engaged with it. Is the client engaged with what the process is going to be, is there enough to do it, is the site any good, what's the builder like? There's so many kind of contingencies that play on how it's going to work out so...

I: Well yes, it's a difficult one but on that note I should leave you because you have a family to go home to...but...
R: I do, I do...

Transcription Ends
set of strategies; vague;

"Big strategies part of a toolkit; flexible, assemble; problem-solving; implicit-> explicit made; explicit made explicit; circular process;

- Flexibility: design process is not a "set of rules" context is the driver; designing is complex (very) and is a responsibility to community and client;
- triggers assist in filtering; subconscious process; subconscious process: allowing it to "happen"; intuition/impression "guides process of concept-building; "falls into place"
- triggers, cognitive + physical; it "comes together"; Creating an experience before form - but form is important in context; Architecture "speaks for itself!" but it's not the most important aspect

Form is not primary concern; makes architecture "superficial";
- controversial; the experience of architecture;
- Design process varies for different projects; sometimes very structured + sometimes fluid.
- factors can change design process; Architecture is about experience;
- Architecture: experience, interaction, context, community

sort of showing it to someone makes idea clearer; need to sort this idea through more testing & refining; Expressing what is in mind; eye to draw on page so I can communicate; speaking of cognitive image to physical image through drawing; communicating to others
"It's in the mind; I just have to communicate it."

It's difficult to design anything good when you are distracted."

Interesting point! So when distracted, you don't design well?"

Focal is important; turn things down etc. \(\text{Strategy} \rightarrow \text{Deliberate} \rightarrow \text{Focused} \rightarrow \text{Focused.} \)

A strange combination of being focussed and being aware of sort of inside and outside world. Sensory awareness but unable to converse.

Daydreaming: process that just "happens" or vision (external) just "turns off" or slips into cognitive vision, difficult to articulate.

This process (state) is what occurs during designing.

I find that reflection upon process; perhaps rather than static images of daydreaming, there is a process of dynamic daydreaming. Using participating to space in mind's eye.

Return to reality, focus on "real space" difficult to adjust deliberate conscious daydreaming: process of distancing from reality.

Communicate the image to others.

But not deliberate.

This process is more than simple recollection of images, memory images versus creating the space in the mind's eye. New images.

Deliberate strategy the more the "deliberate conscious daydreaming", the better the end product. To go right into to understand the space; if one is involved in the space, one can sense what that space is in relation to self, subjective experience rather than designed "at a distance". \(\text{Introspective} \rightarrow \text{Experiencing a space.} \)

Interesting compassion as seeing an image from magazine.
Designing + engagement + impact on outcome

Experience description

- Interesting point about parents saying, “you love,” and “if I could just make it right.”
- Perhaps put personal self in it and making more of the experience of the space. Intimate connection → client relationship → understanding and knowing client means more connection? Sort of: “giv..." give gift"? Activities of client.

- See notes on page, a lot to digest: Architecture is not about form, it's about experience.

This experience is about how the client uses the space and how they enjoy it. How they interact with the space? This kind of design is a kind of gift. Wanting to be as familiar as possible with the space as possible so as to create best possible outcome.

- Through this knowing of the space, he felt familiar with the space... seeing, exploring, testing + experiencing the space. He felt it was as though he knew the space already when it “came into existence.”

Process

Experience of space is deemed the most important aspect; related to this experience of space are materials, light + interaction + being yourself there and imagining the sensory aspects allow you to experience the experience of space...

This relates to other responses also.

I use this process of imagining myself in the space; this way I can reduce problems. If I can experience the space, I can understand it better and therefore preempt the space.

Imagining the space is dependant on other factors though. If reduction of distractions + time constraints + if I can do this, I can focus further + understand certain elements better.

This relates to numerous other responses if I don't understand what I'm doing. Expertise...
"If you're doing architecture properly, you can imagine it. Is interesting point. What does he mean here? Perhaps if you've done the process correctly.

- Trust own process + intuition
- No with it, back yourself

- Pre-empt the use of the space whilst imaging yourself in space of others
- No be too prescriptive

- Fine balance between idealising + prescribing

- Imagining self, activities + considering others
- See others' activities & note mention of family

- Imagining with sensory aspects: temperature + colour
- New aspects: how does the person in the space react to these elements

Building up the image of being in the space: images evolve of the relationship of the space, unfolding through subconscious process. Physical + experiential elements.

- "Something you can touch." Build up to this
- Snippets to a kind of reality

- Experiential elements experienced through involved imaging

- Imagining/imagery is a process not simply about seeing the space in the mind's eye, but it is about perceiving, pre-conceiving the experience of the space.

- It is important to do this.

Experiential aspects rather than form. Form considered as secondary to experiential aspects; success in architecture measured by experiential aspects of space or place, not by aesthetics.

- Reflection: important to be involved cognitively in a project. The involvement includes "getting others" to experience a state of participation + involvement in project even during construction.

- Building relationships w/ others, w/ project, w/ space.
Behavior:
- Events: examples of parties, houses, lectures, conferences, etc.
- Activities:
  - Communicating
  - Imagining
  - Thinking
  - Focusing
  - Daydreaming
  - Participating
  - Seeing
  - Filtering out
  - Intuiting
  - Testing
  - Reflecting

Strategies:
- Being flexible
- Allowing ideas to evolve in your mind, to distill
- Subconscious mind guiding process
- Going to the site to understand project further
- Deliberate conscious daydreaming to gain immersion
  - Immersive self in space to understand it - intimate connection
  - Placing yourself there
  - Getting and ideas to be in cognitive space
- Create relationships to be on same page

Stakes:
- I am there in the space
- They are there with me in the space
- I will come back from the thinking time

Meanings:
- It's in the mind, I just have to communicate it
- Deliberate conscious daydreaming
- The space "comes into existence" and no surprises

Participation:
- I am there with the sun on my back reading
- I am there to take the building there

Relationships:
- Building, site, clients, builders
- Building, context, community
Designing is a process that is flexible; it can be vague. It can change according to the project. I believe that using 'imagining' and being within the space in the minds eye makes my architecture, 'good architecture'. I differ from the norm, in some ways, because I feel that my process is not planned or follows a 'methodology, but rather', I allow it to let itself form, or follow a filtering process.
I tend to consider the experience of a space, rather than what many architects do, which is to consider the form first. I feel that this is not what an architect should admit to, as architecture is about form. Rather, my focus as an architect is on the non-tangible elements, rather than the tangible elements. The aesthetics of the architecture are not of prime concern for me; I deem that the look of architecture is superficial in terms of judging ‘good’ spaces.

I think about why we think the way we do, and the process of how we do it, but I can’t explain it.

I feel that I’m doing architecture in its fullest when I can really be in the space. I am designing, but this doesn’t happen as often as I would like. I feel that sometimes I compromise with my architecture, as the majority of architecture is creating ‘boring’ spaces, but when I can, I create the best spaces I can.

I try not to let my ego drive a project and, therefore, enforce people’s activity and interaction in a space; I believe that spaces should be open-ended.

I’m a little disappointed in the project that I got recognised the most for, as I recognise the failings of the project myself. I feel that this project is recognised for its form or aesthetic qualities rather than for what I believe in. However, it is a learning experience.

I am intrigued with how we think and I like to think a lot about it.

Overall, I believe that my architecture is based on the experiential aspects rather than the typical architectural elements of form. This makes me a little different than how I, as an architect, should be.
Design is about relationships.

* Design:
  - Creative
  - Pragmatic
  - Romantic
  - Evolutionary

Design outcomes:

- Imagination is important
- Evolution of ideas
- Part of creative process
- Pragmatic process
- Creative aspects in design
  - Important
  - Perception of space
  - Not interaction
  - Usability

Creative

Design is about processes:

- Design:
  - Creative
  - Pragmatic
  - Romantic
  - Evolutionary

Visualisation:
- Mental process
  - Physical process
  - Enables for both
  - A self in space

Active qualities of a space:
1. Vital: provides engagement of a space experience
2. Not vital but are important
3. Purely the perception of the user

What designers understand about the process of designing a space:
1. What is the role of imagination in design
2. What is the role of mental imagery in design
3. The importance of emotional qualities in design
4. The role of visualisation in design
5. The role of emotional qualities in design
6. The role of mental imagery in design
7. The role of visualisation in design
8. The role of mental imagery in design
9. The role of visualisation in design
10. The role of emotional qualities in design

Tangible
- Physical
- Mental

Non-tangible