Sustaining Learning: Transformative Experiences in Architectural Education

PART ONE

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THESIS DECLARATION

I, Lara Mackintosh, certify that:

This thesis has been substantially accomplished during enrolment in the degree.

This thesis does not contain material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution.

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The research involving human data reported in this thesis was assessed and approved by Curtin University Human Research Ethics Committee. Approval #: BE-107-2012

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The panoramic photographs in this thesis were constructed by Rachel Pages-Oliver from the photographic evidence collected by myself.

As an academic, during the process of this PhD I have been publishing as a means of informing the research development, but not in direct relation to the content of this thesis. These publications are listed in Part Three to document my journey from teaching practitioner to research academic. The publications are provided for reference only, and are not part of the examined thesis.

Signature: [Redacted]

Date: 17 October 2018
ABSTRACT

This thesis focuses on transformative experiences in architectural learning as a means for prompting, supporting and sustaining positive change in our built environments, and mitigating the negative impact on natural and social environments. The aim of this thesis is threefold. First, this thesis aims to understand how architectural learning can shift the worldview of the designer and subsequently, lead the designer to support design practices that respond positively to changing environments. Second, this thesis aims to identify the core skills necessary for designers to know and understand the environments to which they must respond. Third, this thesis aims to evaluate the impact of architectural learning programs, especially in learning opportunities wherein the development of the core skills is made explicit.

This thesis examines theories of architectural education to understand the complex process of architectural learning. Through this, this study identifies the core skills required of designers and explains how these core skills contribute to designers’ knowledge of environments. Transformative learning theory forms the foundation of this thesis’s understanding of the relationship between learning and worldviews. The principles of systems theory informed the methods used to account for architectural education practice.

The methods discussed in this thesis expand upon the approaches used in current assessments of architectural education practices and are applied to six selected examples of architectural education. This is because the explicit teaching of core skills—critical thinking, communication, and collaboration—is difficult to recognise and document using traditional methods of benchmarking, global ranking and accreditation. Additionally, three case studies of architectural learning were mapped to document the different contexts in which learning occurred. The roles and types of diverse people engaged in learning were recorded through interview narratives. Finally, observations of learning activities captured the different modes of interactions that influenced a shift in worldview for those involved in the learning experiences. The framework that emerged from analysis of the evidence defined the nature of transformative experiences in architectural learning.

This thesis contributes to the knowledge of how the relationship between people and their environments can be improved by a shift in architectural learning. The impact of the built environment on climate change has been recognised since the 1960s. As such, there is a need for the explicit development of the core skills in architectural education. Developing these core skills requires more than sharing of knowledge and projects. The understanding of situations and change, the use of common languages, and engagement with diverse individuals and communities contribute to a design process that is resilient and responsive to change.
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LIST OF ABBREVIATIONS

AACA Architects Accreditation Council of Australia
AIA Australian Institute of Architects
GHG Greenhouse gas
IPCC Intergovernmental Panel on Climate Change
OECD Organisation for Economic Co-operation and Development
RIBA Royal Institute of British Architects
UIA International Union of Architects
UNEP United Nations Environment Programme
CHAPTER 1: INTRODUCTION

This thesis focuses on architectural learning and the transformative experiences that can prompt an approach to design to support responsible behaviour and sustainable development. Sustainable development is recognised as a means of mitigating and adapting to climate change—that is, understanding that the relationship between people and the environments in which they live demands responsible behaviour. In the last 50 years, global warming has become widely accepted by society at large as anthropogenic (Le Truet et al. 2007, 98) with the construction and occupation of the built environment continuing to contribute to climate change. For communities, climate-responsible design must be shaped by individual and collective needs, but also use strategies that are sustainable. Climate-responsible designers must have the ability to understand not only the needs of communities, but also their physical environments and the relationships that exist between them. This ability to understand needs, environments and relationships, typically developed through tertiary architectural education, supports the architects’ role in sustainable development. This understanding of others can shift the role of architects as design processes prompt communities to better understand their own needs and their relationship with their environments.

This thesis poses three questions. First, how can transformative experiences in architectural learning prompt, support and sustain responsible behaviour and sustainable development? In this thesis, responsible behaviour is defined as individuals (in this case students, staff and communities) making changes in everyday situations to knowingly support and meaningfully benefit self and others, both immediately and in the future. Sustainable developments are designed in recognition of the benefits for all individuals and communities, and in response to changes in environment. Climate-responsible designers rely on their skills to understand the needs of individual users and communities, the environments in which they live and the relationships that exist between them.

Second, what are the core skills that designers must acquire to understand people’s needs, environments and the relationship between them, and how do designers develop these skills? While architectural education theorists have identified these core skills to be critical reflection, communication and collaboration, understanding how these skills are developed requires an examination of architectural learning that is different from the current methods.

Third, can the development of these core skills be made explicit and more visible in architectural education? Different methods of documenting and analysing learning experiences have been developed in this thesis to identify the nature of architectural learning.
experiences. This process of analysis has been designed to understand how the development of skills and knowledge takes place in architectural education, and to better understand what can influence this learning process.

This research began with an interest in how people—particularly architects—learn about sustainability and how learning can change how people live. The view of architectural education is broadened to explore the experience of architectural learning, and consider the multiple variables and influences that affect these experiences. Built environments that meet the needs of diverse clients and communities support the changes in lifestyle and behaviour that have been called for. The design of such environments is the result of the critical thought processes of designers and stakeholders, collaborative processes and meaningful communication that leads to shared understanding by all involved. Identification of how such behaviour change can be prompted, supported and sustained through architectural learning arises from questioning current practice in architectural education. As most formal architectural learning takes place within higher education, this discussion focuses on formal architectural programs in higher education institutions, typically universities. It is important to note that this thesis is not a comprehensive analysis of the quality of architectural education programs, but a re-examination of the programs as a means of understanding the nature of the learning. With almost 1,200 schools of architecture globally, it is not within the scope of this thesis to provide an overview of all modes of architectural pedagogy and teaching practices. Rather, case studies have been used to explore examples of transformative learning and analyse evidence of transformation.

Three case studies of architectural learning were selected based on their innovative outcomes, which extended beyond the formal learning experience. In my capacity as researcher, I visited the programs at University of South Australia, Auburn University, and Victoria University of Wellington to broadly examine the range of educational experiences created and thus, evaluate the impact of the experiences on the staff, students and communities involved. The focus of the Master of Sustainable Design program at the University of South Australia was on the environmental responsibility of the professions. The program at Victoria University of Wellington integrated architectural theory and science through real-world demonstration At Rural Studio, the social context was placed at the forefront of the learning experiences, and students and community work together developing skills through practice. My understanding of these experiences was informed by the mapping, recordings and observations made while visiting these programs.

It became evident that the learning experiences at these case studies could not be replicated elsewhere. This is because these learning experiences respond to specific contexts,
SUSTAINING LEARNING 1: Introduction

rely on key stakeholders, and are linked to unique locations, time and person(s). The focus of this thesis emerged from the type of learning experiences provided by these three case studies of architectural learning. The findings of this thesis’s examination of the learning processes—not the learning outcomes—has identified why practices in architectural education must change and how transformative experiences in architectural learning contribute to responsible behaviour and sustainable development.

1.1 The Built Environment and Climate Change

A designer’s understanding of context, stakeholder experience and environment is a key component of sustainable development. Sustainable development, as defined in Brundtland’s (1987, 39) *Our Common Future* report, refers to both present and future needs. However, it could be argued that in the 30 years since the publication of the Brundtland report, the pace and type of development that has occurred could not be considered sustainable. This is evidenced by the ongoing assessment reports issued by the Intergovernmental Panel on Climate Change (IPCC 2014), in which observed changes in our climate are shown to be compromising the ability of future generations to meet their needs, as many of the systems affected are considered essential.

The connection between climate change and the built environment is complex. While designs are improving with the advent and integration of technology, climate change is continuing and the built environment contributes to this. As reported by the United Nations (UN) Sustainable Buildings and Climate Initiative (United Nations Environment Programme 2015), buildings use about 40 per cent of global energy, 25 per cent of global water, 40 per cent of global resources, and emit approximately one-third of greenhouse gas (GHG) emissions (United Nations Environment Programme 2015). The UNEP acknowledges that ‘buildings also offer the greatest potential for achieving significant GHG emission reductions, at least cost, in developed and developing countries’ (United Nations Environment Programme 2015). While improvements have been made, accelerating urbanisation has increased the need for resources and the consumption of energy, resulting in increases in GHGs and the consequential climate change (United Nations Environment Programme 2015). While both the negative and positive impact of urbanisation is more significant in developing nations, reduction of the negative impacts has not been realised despite significant technological advances in developed nations. Increasing levels of wealth and lifestyle are contributing to

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1 According to Brundtland (1987, 39) “sustainable development ... meets the needs of the present without compromising the ability of future generations to meet their own needs”
increases in building energy use. This is because the long life spans of existing building stock lock-in higher energy requirements (Lucon et al. 2014, 675).

In a world that is becoming increasingly urbanised, the built environment is a critical element in current climate and ecological science research, evidenced in documents such as the assessment reports issued by the IPCC (2014). However, the scenarios presented in these reports focus primarily on the impacts of technological change and the uncertainty expressed regarding the possible outcomes of change in the system. In part this is due to the unknown effect of human behaviour, and the drivers for change. The anthropogenic ecological crisis that was emerging at the start of the twenty-first century led to a questioning of the way in which we dwell on the earth. This in turn led to an inclusion of environmentalism as part of the ethical and moral discourse at the time (Fox 2000). Nevertheless, the technological advances in environmental architecture have not significantly contributed to the mitigation of climate change, nor the individuals’ ability to adapt to it and had not yet broken into the designers’ cultural consciousness (Hagan 2001, xi).

The situation has changed since the start of the twenty-first century, and the environmental consciousness of designers and communities alike has strengthened. While advances in technology have contributed significantly to the reduction in energy consumption in buildings, environmentally sustainable design principles remain the foundation of energy efficient design. Often the passive strategies employed require an ‘active’ user to make adjustments to the buildings features that affect performance (e.g. the operation of ventilation, and heating and cooling systems). For this to occur, users require an awareness of the external and internal conditions. While such systems can be automated, it is through the increased awareness of surroundings and connectedness to our environments that the occupation and use of buildings becomes more meaningful and the impact of decisions understood. Lifestyle decisions, attitudes towards conservation of energy and natural environment, and social values inform certain behaviours within the built environment that contribute to the emission of GHGs. While the built environment plays an obvious role in development, changes in user behaviour are required for this development to be considered sustainable (Mackintosh 2009).

However, the nature of technological advances, and the increased efficiencies they have provided in resource consumption and waste management have not necessarily shifted the cultural consciousness of designers of the built environment, and the communities who live in these environments. It has been recognised that the language of the built environment can support the development of sustainable values through experience and provide a successful educational environment (Newton 2007) that satisfies the user’s community’s
needs (Higgins et al. 2005, 12). What is not immediately evident is how this language is developed and applied, how the community needs are recognised and understood by the designer, or how the capacity of communities to respond to changing conditions can be supported. There are many programs, such as “Agenda 21”, that focus on education as a means of fostering this behaviour change through the provision of information and increased awareness (United Nations Commission for Sustainable Development 2011). However, the cultural consciousness of designers is influenced by the way in which they view the world; designers’ worldview influences the way in which they think, communicate and make decisions, often as part of a larger team.

1.2 The Role of Education in Developing Values and Worldviews

It is important to acknowledge the role of education in the development of the individuals’ worldview. The built environment is considered one of the key places wherein the meaningful interactions occur, which leads to the development of values. The design of the built environment supports the development of sustainable values through meaningful experiences and increased awareness of the relationship between the built, human and natural worlds. In discussing declining attitudes towards environmental conservation, James Miller identified the problem with our increasingly disconnected experiences of nature. Our earliest childhood experiences of the natural environment have been identified as where, through meaningful interactions, we learn to place value on the environment, and our awareness develops through subsequent experiences (Miller 2005, 431). In turn, this awareness influences behaviour. For this influence to be meaningful, access to the natural environment must be possible as part our everyday actions. This is becoming increasingly more difficult. Almost all population growth is expected to occur in urban areas in the period between 2010–2050 (McGranahan and Satterthwaite 2014, 10). In a world in which an ever-increasing proportion of the population is now urbanised, often people’s primary context is built, not natural.

In Australia many of our environmental attitudes and values are formed in school as environmental education has been a part of primary and secondary curricula and teaching practice since the early 1960s (Prietto 2011). In a review of literature investigating how educators have responded to the current ecological crisis in the development of environmental education, terms such as ‘ecological literacy’ and ‘mental ecology’ have been used (Schwartz and Schwartz 1995). The elements of culture, ecology and education are considered important in the interactive relationship between living beings and the natural
environment. However, more than one decade later, there was little positive change in the ecological crisis; recent trends in the nature of environmental education indicated that a need for the learning experience to cross over into everyday life was required (Department for Education and Skills 2011). In addition, it was noted that recent research and current education programs do not typically address the role of the built environment as part of environmental education or—in the case of tertiary architectural education—environmental issues are addressed in a manner that is implicit or inferred (Ostwald and Williams 2008, 129).

The *Merriam-Webster Dictionary* (2016a) defines ‘education’ as ‘the process of receiving, giving or imparting knowledge and / or skills’. This definition implies that knowledge and skills are developed as information is transmitted from teacher to student. It suggests that these transmissive actions are often one-directional or non-reciprocal—the student is educated by the teacher, but the teacher is not educated by the student. Conversely, ‘learning’ is defined as ‘the acquisition of knowledge and/or skills through experience, study or by being taught’ (Merriam-Webster Dictionary 2016b). The implication here is that knowledge is developed through personal experiences and relationships are made through the interactions of the people participating. Through these interactions, a transaction or exchange takes place, in which knowledge is acquired through effort, or wherein the act of teaching is also a learning experience. Focusing on architectural learning, and more specifically the experience of architectural learning, enables these interactions and their outcomes to be examined more closely, while acknowledging the broader situation in which these experiences take place. While meaningful interactions and awareness are increased through the experience of the physical environment, the learning experience itself can also influence behaviour.

In environmental education, learning is often structured to inform behaviour and to institute sustainable behaviour changes by providing learning experiences that affect the development of personal beliefs and values. In addition to formal learning experiences, the informal experience of environment in the everyday informs an understanding of these environments, and the nature of experience shapes the way in which they are valued. When considering architectural education, the behaviour of the user of the designed outcome is most often considered, and understanding how this behaviour is influenced through design is one of the many foci of architecture programs. However, it is not clear how this understanding of others is developed explicitly through architectural education.

A review of publications from the last 25 years that related to architecture and education identified the common areas of focus within the architectural research that focuses on education. These focus areas included the educational context (e.g., the curricula of the programs), the interaction between the built and educational contexts (e.g., the building as a
learning resource), and the demonstration of discipline-specific skills and abilities. However, while knowledge and how others make meaning within the built environment are discussed, the role of worldview and the epistemological positioning of the architectural educational program itself were not often explicitly addressed. When change was discussed in the literature reviewed, the nature of the change remains centred on student skill development, the educational and built contexts, and the education systems itself. This review identified that current discussions about architectural education do not address the pedagogical practices that support the shift in worldview required in response to social, professional and environmental change.

1.3 Architectural Education and the Need for Change

In 1958, the Oxford Conference demonstrated a pivotal shift for architectural education that coincided with the emerging environmental consciousness. Richard Llewellyn-Davies, a key figure in the 1958 Oxford Conference and contributor to the development of the research vision for the RIBA at the time, demanded that architectural education form a bridge between the Arts and the Sciences (Llewellyn-Davies 1960, 709). As professor at the Bartlett School of Architecture during 1960 - 1969, Llewellyn-Davies implemented changes reflecting this demand, which influenced the development of architectural and environmental studies programs at the Bartlett school of Architecture for over 40 years. These changes broadened the knowledge and skills that were considered essential to effective architectural education. This was revolutionary in a time in which science was perceived to be divorced from practical life. However, knowledge of social science develops an architect’s understanding of how design affects people, while scientific and technical literacy is necessary to support the ongoing development of technical expertise in practice. Llewellyn-Davies (1960) noted that maintaining current technical literacy was difficult due to the rapid pace of technological change in materials and construction. While acknowledging that studio pedagogies developed strong skills in visual communication, he suggested that developing skills in methods of communication beyond drawing were critical (Llewellyn-Davies 1960).

Frustration with architectural education practices remain. Since 1960 this tension has continued as a result of competing ecological and technological crises, and the duty of social responsibility. For example, Rethinking Architecture, a collection of essays on architecture written in 1997, was penned by key philosophers and cultural theorist of the twentieth century. It offered an alternative take on the question of architecture and challenged many of the accepted tenets of architecture theory from a broader cultural perspective (Leach 1997).
Issues relating to the built environment were discussed in the light of the social sciences and cultural theory, shifting the discourse on architectural education from a technological focus to one of a social nature. By 2012, the focus had shifted again. The *Architectural Review* published a series of articles entitled ‘The Big Rethink’. This series aimed to stimulate new ways of thinking about a more complete architecture in response to the then current global ecological and economic crises (Slessor 2012, 15). The commonality between these diverging discussions about architectural education is the growing need for the core skills of critical and reflective thinking, communication beyond the visual, and collaboration across disciplines.

It has been recognised that critical reflective practices can make tacit knowledge more explicit and in doing so foreground learning within the design practice (Schön 1983). A transformative pedagogy for studio teaching offered an alternative to architectural education in which the hidden curriculum—the unstated values, attitudes and norms that stem from the social relations and content of the course—‘reinforced … certain ideologies, values and assumptions’ (Dutton 1987, 17). Developing skills in critical thinking and reflective practice can strengthen the social responsibility of architectural students, as they come to understand not only themselves, but the diverse worldviews of others.

In addition to learning technical skills and knowledge architectural students must develop teamwork and collaboration skills, and effective communication skills. The nature of relationships with clients can change, as the expectations and level of engagement of clients can increase in architectural practice (Nicol and Pilling 2000, 3). To understand and be understood by all people involved in the project, especially clients, requires skills in multiple modes of communication and non-discipline specific language. However, reviews of architectural education have noted the declining presence of ongoing explicit instruction concerning communication in the architectural curriculum (Ostwald and Williams 2008, 129). This decline suggests that once the discipline-specific language is learnt the opportunity to develop skills in different modes of communication is limited. In a survey of over 120 architecture schools worldwide, Salama (2012, 11) noted that there was an emphasis placed on the students’ skills in drawings and form manipulation, with little requirement for the demonstration of architecture-related knowledge and critical thinking abilities. Ability in multiple languages would foster exploration in multiple mediums and encourage critical reflection, encouraging students to reinterpret problems and reinvent solutions. Salama (2012) has also noted that some learning activities occur off campus, changing the environments in which the learning takes place. However, these visits can be ‘simply casual and are not structured in the form of investigation or inquiry’ (Salama 2012, 11). These visits are often used to document or record information, but are not often used to analyse and synthesise the
information to identify and frame a problem. This can limit the development of critical analytical skills.

Low levels of inquiry and limited critical and reflective thinking by students can result in fragmentation of knowledge, with minimal integration of the technical and social knowledge in design. The architectural profession is becoming increasingly complex with the proliferation of new materials and modes of manufacture and assembly, as well as new software and modes of analysis of performance. This complexity is due in part to the influence of the many disciplines that inform these new technologies and practices. However, the skills in collaborating across disciplines are not necessarily being developed in architecture schools (Buchanan 2012, 92). This lack of collaboration becomes a skill deficit that results in architects’ difficulty in explaining their work to others (including non-architects), failure to test the hypothetical solutions they develop, and inability to explain the processes that have led to a design (Salama 2012, 12).

The core skills—critical thinking, communication and collaboration—are often considered ‘soft’ or ‘non-technical’ skills and as such, they are often deemed secondary to the discipline-focused skills that form the basis of architectural education. The technical complexity of architecture, the increasing diversity of stakeholders, and the shifting focus of architectural knowledge can be documented and accounted for by educators, researchers and students using technical and discipline-specific skills. However, information can now be found from sources across the world and insights are easily disseminated to a global audience. The role of the environments—built, natural and social—in which we live is becoming more explicit and the impact of rapid change is more keenly felt. Mastery of these non-technical skills ensures that the breadth of information from the many disciplines and stakeholders involved, and the diverse experiences in differing situations, are comprehensively understood. The outcomes that emerge from a design process that fully utilises these non-technical skills to respond to ongoing change benefit not only the individuals directly involved, but the community and broader society.

Leopold (1987, c.1949, viii), anticipating the environmental crisis of the mid-twentieth century, understood nature not as a commodity, to be bought and sold, but as a public good. Similarly, architecture can also be understood as a public good: a service available to all members of society. Architecture moves beyond the realisation of a final project and provides identity, shelter and function for a community. Sustainable development and climate-responsible design, which was initially an ethical issue, has become a technical, political and legal issue. The ecological consciousness of Frank Lloyd Wright and Richard Neutra—which resulted in low-energy, passive designs—has adapted to become the foundation of social and
political change within the design industry (Ingersoll 2012, 578). The economic concerns of the energy crises of the 1970s prompted research and development of energy efficiency. Likewise, concerns of social inequity in developing nations focused on the need for ‘appropriate technology’ for an eco-efficient approach (Ingersoll 2012, 579). Such developments typically relied on the experiences of the designer and their understanding and experience of environment. However, when coupled with a more mobilised and internationalised population, providing architectural services requires an understanding of new contexts beyond the immediate experience of the designer. In a world that is rapidly changing, these contexts also change: what was typical or understood through previous experience may no longer be relevant. The natural environment is becoming hidden or lost to those who live in increasingly urban environments. The relationship between the built and natural, regardless of the scale and visibility of each of these environments, is changing for a growing proportion of the global population.

The need to respond to global change, and a desire for change in the architectural profession, has implications for architectural education in the future (Brown and Holder 2013, 2). The social culture and the manner of teaching and learning are as important as the formal content of learning within the schools of architecture (Nicol and Pilling 2000, 7-8). It has been argued that when designing takes place in environments that reflect the complexity of the real world, using the specific language of design as part of a collaborative process strengthens skills in communication with others (Papanek 1983). This position remains relevant as regulation and accreditation restrict significant change in the content and the structure of architectural education programs. The complexity of architectural projects continues to increase with ongoing technological advances. Clients, stakeholder groups and communities are becoming increasingly diverse with urbanisation and a more mobile global population. The pace of change of the world itself is increasing. To respond to the dynamic situations in which we live and work, we require processes that enable us to identify change, assess the impact and shift our position and understanding.

The critical elements of transformative learning identified by examining the nature of learning experiences develops the capacity of individuals to change. The multiple methods of learning that accommodate different abilities of learners supports the skills of understanding of diverse communities and environments. Transformative learning experiences provide the catalyst for the shift in designers’ worldview, refocussing them on the value of communities and decisions that provide long-term benefits. The nature of transformative experiences in architectural learning is identified through an understanding of how development of skills and knowledge takes place and what can influence this process. These transformative experiences
support the provision of climate-responsible architectural design that provides both immediate and long-term benefit to individuals and communities.

1.4 The Structure of this Thesis

This thesis is presented in three parts, separated for clarity. Part One—the main body of the thesis—stands alone with full evidential support of the appendices as needed. Part Two includes four appendices in which the theoretical underpinnings and the documentation of the selected architectural programs and examples of the evidence collected from the three case studies of architectural learning I visited is presented. These appendices demonstrate the research, synthesis and analysis undertaken to understand the nature of transformative experiences in architectural education programs. The reader is invited to examine this evidence, to reflect on their own experiences and understanding of architectural education, and to consider how their practices may be transformed. Part Three comprises the articles and papers I have published during the course of this research. These publications document my own transformation from teaching practitioner to research academic. This transition has been both rewarding and challenging. Publishing early on this journey with teaching colleagues has developed my pedagogical practice. Co-authoring with academics outside the field of architecture offered new ways of thinking about learning and developed my understanding of the challenges of reflective practice. My position on architectural learning was strengthened in response to the feedback received from reviewers publishing my initial theories and findings in educational journals. Sharing experiences of teaching and learning in professional environments with colleagues has extended the possible applications of my new knowledge. Throughout this research, I have been prompted to reflect on the successes and difficulties faced by myself, my colleagues and my students, in the learning experiences I have created. These publications, when viewed chronologically, demonstrate how my academic and professional practices, and my worldview, have transformed.

This Introduction discusses why the focus of architectural education practices must change to ensure that the development of the core skills of critical reflection, communication and collaboration becomes more explicit. As the construction and occupation of the built environment contributes significantly to anthropogenic climate change, focusing on formal architectural learning—wherein future designers develop their skills and knowledge—is critical. Providing transformative experiences in architectural learning can shift the worldview of future designers and refocus them on the value of communities, so the decisions they make provide society with long-term benefits. Understanding how the development of core skills
and knowledge contributes to the formation of individuals’ worldview has informed a framework of practice, which seeks to identify transformative experiences in architectural learning. These transformative learning experiences promote climate-responsible architectural design, which provides both immediate and long-term benefit to individuals and communities.

Chapters 2 and 3 describe the complex process of architectural education. Architectural education is explored in terms of its underpinning theoretical context; this theory is important because it informs the nature of architectural students’ skill development and learning. Chapter 2 provides an overview of the background of current architectural education to identify the significance of these core skills to architectural knowledge and practice. This thesis’s view of architectural education is broad; it looks beyond curricula and learning outcomes to the role of epistemological positioning and worldview. Chapter 2 explores how people understand the world and how learning—as opposed to education—shapes individuals’ worldview. Learning is discussed in relation to epistemological positioning; knowledge building shapes individuals’ understanding of self and world and subsequently, individuals’ actions and behaviour. Understanding the process of transformative learning is critical to ensure the worldviews, behaviour and values of future designers shift through their development of the core skills—critical reflection, communication and collaboration—throughout their architectural education.²

Current methods of assessing architectural education practice—global rankings and accreditation procedures—do not identify how core skills are learned or acquired. In this thesis, a closer examination of architectural education is undertaken to determine how acquisition of these core skills can support, prompt and sustain transformation of worldview, and subsequently, architectural practice. Chapter 3 discusses the role of epistemological positioning within architectural programs, the differences in learning abilities and skills, and the way in which learning is recognised in architectural programs. To identify not only what students learn about architecture, but also how they view the world, a systems model is applied. This model is reflective of the broader contexts in which architectural learning takes place, the people who participate within this system and the interactions that occur. However, to understand the ways in which individuals’ worldviews can be transformed, different methods of examining architectural education programs are required.

Chapters 4 and 5 outline the different documentation methods used in this thesis to understand how learning in selected architecture programs can be captured, and to identify how this learning has supported transformation. Using the systems model as a starting point,

² Additional background and an in-depth discussion regarding the complex process of architectural education can be found in Appendix B.
methods of documentation and analysis have been developed and applied to selected architectural education programs. Chapter 4 discusses the mapping techniques that are used to document the elements of the learning system, students’ worldviews, their assumed abilities and the ways in which architecture students’ learning is visible. However, the learning experiences, as opposed to education practices, remain difficult to capture using only these methods. Thus, additional methods of documentation have been developed. These methods include mapping and photographing the environments in which the programs occur, interviewing those involved in the programs, and recording observations of staff and students’ actions and behaviour in the field. Chapter 4 discusses the coding framework, which was used to organise the documentation created, and the three methods of analysis and the key characteristics of the learning experiences within the selected programs. The purpose of this method of documentation—and subsequent analysis—was to assess architectural education programs’ development of the core skills identified in Chapter 2 and identify the role of transformative experiences in skill development.

In Chapter 5, high ranking architectural education programs at Massachusetts Institute of Technology, University College London, Delft University of Technology, University of California, Harvard University and Southern California Institute of Architecture are re-examined. While this examination identifies that these programs support the development of the core skills, there is little evidence of a subsequent change in practice and lasting transformation resulting from a shift in worldview. In this thesis, three additional programs have been selected as case studies to assess the transformative experiences. The programs at University of South Australia, Auburn University, and Victoria University of Wellington each have a specific focus: a change in educational practice, a change in professional practice, and a change in values and worldview. The methods used to document the three case studies include the key characteristics of transformative experiences (as determined by the coding framework), and the ways in which students’ development of core skills was identified in the evidence collected. The changes that have resulted from learning have been made evident by the documentation of these case studies. The analysis of the documentation has identified the types of experiences that are most likely to prompt, support and sustain transformation.

Chapters 6 and 7 discuss the ways in which transformational learning—resulting from a shift in worldview—can influence students’ decision-making. It is evident from the analysis undertaken in Chapter 5 that transformative experiences require more than the provision of

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A description of the process in which the researcher developed methods of documentation, and the organisation, coding and analysis of evidence can be found in Appendix B.

The resulting documentation of the architectural programs using these methods can be found in Appendix C.
the key characteristics of architectural learning activities. In Chapter 6, the organisational structure of the analysis framework is developed further to recognise the other factors that must be considered when assessing architectural learning experiences. Learning experiences, and subsequent transformation, takes place over different time periods in different architectural education programs, for different students. The intensity of the experiences, the complexity and the density of the contexts and the groups of people involved, influences the profundity of the experience. Providing capacity for change, and building the agency of those involved, contributes to the ongoing success of the transformation. These factors informed the definition of the three types of learning experiences—events, situations and activities—identified through analysis of the case study evidence. Further, Chapter 6 identifies that transformation can be prompted by events that are unexpected or uncomfortable—thinking critically during, and about, these events can act as a catalyst for change. Changes in worldview are consolidated by situations in which new skills and understanding are tested and refined. As such, activities that strengthen these skills and understanding sustain the transformation. Chapter 6 presents the findings of the case studies and highlights that transformative learning events, situations and activities can be linked to the development of core skills and increase the potential for change within the learning experiences.\(^5\)

In Chapter 7, the ways in which current practices in architectural education could be modified to create positive change are presented. The findings discussed in Chapters 5 and 6 identified ways in which learning experiences lead to changes in the people, the environments and the system itself. As such, Chapter 7 discusses the three core strategies for learning that could lead to transformation when integrated in existing architectural education: the impact of goal setting within the design process, the importance of skills in communication, and the need for critical thinking to challenge assumptions and values. Effective communication is necessary for diverse groups to interact meaningfully and recognise the benefits of learning in, and alongside, other communities and social groups. Through collaboration, change can be contextualised: the reason for the change can be viewed from multiple points of view and the impact of change on others can be understood.

The four appendices accompanying this thesis provide evidential support. The appendices are separate from the main body to maintain the flow of the argument and so that both argument and evidence can be read side by side. Appendix A presents background for the complex process of architectural education. The epistemological positions that underpin the learning experience are outlined and an understanding of different learning theories and

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\(^5\) The documentation of these case studies can be found in Appendix D.
recognition of the different ways in which individuals learn is presented. Appendix B provides a description of the process by which the methods of documentation, and the organisation, coding and analysis of evidence developed. Appendix C presents the documentation created for each of the selected architectural education programs and discusses the findings that have emerged from the analysis of this documentation. Additionally, Appendix D presents the selected case studies of architectural learning using additional documentation methods and demonstrates how analysis of this documentation created is used to identify the nature of transformative experiences in these programs.

Current practices in formal architectural education are examined to better understand how learning experiences influence the worldviews of future designers. As such, this thesis seeks to identify how certain experiences can change attitudes and values to subsequently support change in architectural practices. It is recognised that the capacity to make change is limited as the built environment is only one component in a complex global system. While it is important that designers are educated to become leaders of this change, the framework for transformative experiences and the methods used to document learning discussed in this thesis can also be used to educate and prompt a change in worldview of others. However, in order to do so, an understanding of the complex process of architectural education is required.
CHAPTER 2: ARCHITECTURAL EDUCATION

This chapter introduces the complex process of architectural education. It explores how knowledge and skills can be developed throughout architectural education to influence students’ understanding of the world and others. Thus, students’ worldview shapes their use of climate-responsible design. Architects develop the knowledge and skills necessary to design responsibly as students; they learn about the nature of the environment, the needs of the clients and the potential impact of design. However, the construction and occupation of the built environment continues to contribute towards anthropogenic climate change. Thus, there is a need for change in architectural education to adapt to, and mitigate, this escalating global issue. Initially focused on technological knowledge, architectural education has shifted focus to teaching the skills necessary to develop environmental, social and cultural understanding. Yet, the structure of architectural education programs—established as a result of long-term monitoring and regulation by national and international bodies—has remained essentially unchanged since the 1980s (Buchanan 2012, 92). Currently, educational practices prioritise design skills over technical, environmental and cultural understanding, and value the designed artefact over the process of designing. To be effective in a changing global context, architectural education must acknowledge and prepare students for projects that are becoming increasingly complex (in terms of brief and stakeholders) and require increasingly complex understanding.

This thesis is informed by the research of Ostwald and Williams, in which they identified that architectural education must extend beyond the program content and structure. Ostwald and Williams (2008) recognised that there exists a complexity in architectural education, in which many elements of design and knowledge domains must be integrated for students to comprehend the demands of the profession. However, the view of architectural education underpinning this thesis is broader. This thesis acknowledges the multiple environments in which architectural learning takes place. The dynamic nature of these environments, to which architects must respond, means that architectural education—the teaching of skills and understanding within these changing environments—must also respond to these changes.

While it is widely acknowledged that the pace of change has increased over recent decades, it is of interest to this study to consider how change has influenced the relationship between people and the environments in which they live. Futurists, such as Hawkins (2007) and Kurzweil (1990), have identified moments in history when paradigm shifts have occurred.
and change has accelerated. While advances—such as those in technology—can be significant and are becoming increasingly rapid, the nature of how and where we live remains relatively unchanged. Arguably, advances such as increased processing speed of computers, rates of production and the increase in the scale and speed of communication are not paradigm shifts, but improvements in efficiency and increases in scale. These advances have not necessarily shifted the way in which individuals understand the world and their place within it. However, this shift in scale and speed is having an impact on this world, and we must understand these changes to be able to adapt to and mitigate the effects of human impact on the environment. Learning and the acquisition of knowledge contributes to developing this understanding.

2.1 The Complex Process of Architectural Education

As a vehicle for knowledge building, the way in which architecture is taught contributes to architects’ complex and dynamic understanding of the world (i.e., worldview). The epistemological position of the worldview taught in architectural education programs has shifted over time, in response to social, cultural and economic changes and events. At times, the world has been defined in terms of the architectural experience, and knowledge was constructed through the creative process of architectural design and making. With the emergence of the machine age at the turn of the nineteenth century, science as means of understanding the world became increasingly relevant to architecture. Within the field of the science of design, the search for scientifically designed products shifted the ways of thinking about design and knowledge building. This was evident in the heightened desire to produce works of art and design based on objectivity and rationality—the values of science (Cross 2001, 49). More recently in the 1960s, the relationship between science and design resurfaced, as design methodology attempted to apply the scientific method to everyday design practice. Increasingly, the global significance of human activities and the role of the built environment in mitigating and adapting to global climate change have been recognised. This recognition has influenced the aspects of architectural knowledge that have been valued in architectural education.

To understand the complex relationship between knowledge building and the process of design, the seminal works of three key theorists, Simon (1969, 1981, 1996), Alexander, Ishikawa and Silverstein (1977), and Schön (1983), must be considered. These theorists identified the core skills that contribute to knowledge and knowledge building through design. In *The Sciences of the Artificial*, Simon (1969) likened the process of designing to the process of decision-making—that is, critically thinking about the world and our place in it—as a means of
gaining understanding. This approach to knowledge building united Simon’s research across the many disciplines to which he contributed. With a focus on human-centred design, Alexander, Ishikawa and Silverstein (1977) recognised the need for a universal architectural language. This pattern language was one which all people in society could contribute to, and use to communicate to understand others and the environments in which they live. In his book *The Reflective Practitioner*, Schön (1983) acknowledged the importance of reflective inquiry to lifelong learning. His finding is especially relevant to learning as part of professional development and design practice.

Originally published in 1969, Simon’s *The Sciences of the Artificial* was written in response to the perception that the teaching of the natural sciences had taken precedence in the curricula of design professional education (Simon 1969, 1981, 1996). In the ‘design science decade’, science, technology and rationalism were offered as the solution to the emerging human and environmental problems of the 1960s (Cross 2001, 50). Simon (1981, 157) proposed that the ‘science of the artificial’ was necessary for design professionals to understand how the process of designing an artefact contributes to ‘a common understanding of the outer and inner environments that define the space in which we live’. However, if this process is focused too tightly on the artefact itself, the artefact and the inner and outer environments become disconnected. This occurs when a specific language such as a machine language, is needed to create the artefact. A pronounced disconnection occurs when only those who have received the specialist architectural education and know the specific language can understand the artefact.

In reaction to Simons approach to design, a new paradigm for environmental design was sought (Dovey 1990, 3). In 1977, Alexander, Ishikawa and Silverstein published the first of two volumes of design principles, *A Pattern Language: Towns, Buildings and Construction*; this was followed by Alexander’s (1979) *The Timeless Way of Building*. These publications offered a way of thinking about environmental design, in which what is known about the world could be considered measurable and common to all, regardless of situational context and experience (Dovey 1990, 4). By proposing a cascading language of architecture, which can be used to

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6 The outer and inner environments, understood through the natural sciences, are primarily concerned with ‘how things are’. The designed artefact is understood as an interface between the outer environment (i.e., the situation in which the artefact is placed), and the inner environment (i.e., the conditions within the elements of the artefact). This artefact can be better understood through ‘the science of the artificial’, the study of man-made things or ‘how things ought to be’.

7 Alexander, Ishikawa and Silverstein (1977, x) argued that ‘towns and buildings will not be able to become alive, unless these they are made by all people in society, and unless these people share a common pattern language, within which to make these buildings, and unless this pattern language is alive itself’. Through the examination of cases studies, a language of patterns developed—a network of elements laid out in sequence—which responds to the situation in which the design is located. There are
‘make a project’, Alexander (as quoted in Dovey 1990, 4) described patterns that were derived from the lived world of everyday experience. This language became an organisational framework and a guide for designers’ decision-making, based on and informed by the designers’ understanding of the specific situation or context. The result of this decision-making was collective knowledge building; studies informed the pattern language and were informed by the environments that were designed using this language. This process required designers to understand the world through the experiences of others. Through the creative process of designing, this understanding was reflected back to others to prompt awareness of their own understanding.

In his book *The Reflective Practitioner* Schön (1983, 46-47) also criticised the logical, positivistic approach of Simon and argued for a shift from technical rationality towards reflection-in-practice. Schön (1983, 55) argued that intelligent action—action that was decisive and purposeful—often involved implicit learning or tacit knowledge. He suggested that knowing manifested in actions and judgements that often occur spontaneously. Individuals were often unaware that learning has taken place, evidenced by the fact that they were often unable to describe the knowing that the actions reveal. Schön (1983, 59-69) argued that through reflection-in-practice this tacit knowledge was made explicit, bringing the knowledge gained to the fore. The good process of design was one in which reflection-in-action is made possible through the language of designing, wherein drawing and talking occurred simultaneously as part of a design process.

Despite their differences, these theorists acknowledged the importance of the core skills of critical thinking, communication and collaboration. The theorists agreed that reflection and critical thinking are considered a means of understanding the world and the experiences within it. They acknowledged that communication requires a common language that is understood by those involved in the design and the use of the built environment. Additionally, the theorists identified that understanding the world is a collaborative activity. It is through the sharing of experiences and points of view that we increase the breadth and depth of understanding. Of interest for this thesis is the way in which this knowledge and understanding is used to make decisions and solve problems in design.

Since the 1960s there has been a number of approaches to design, such as design as ‘wicked’ problems (Rittel and Webber 1973), user-centred design (Schön 1983), metadesign
(Manzini 2008) and service design (Kimbell 2014). These approaches, in which design is an open-ended process with no clear anticipated outcome, are particularly relevant to the type of design problems that could be expected from a rapidly changing world. However, while such approaches to the design process are embedded in the practice of architecture, the way in which architecture is taught does not necessarily reflect this. As such this raises questions about where the necessary skills of communication, collaboration and critical thinking are being explicitly taught or made evident to architecture students within architectural education programs.

Design is considered in this discussion not as an isolated area of the curriculum, but rather as the activity and process through which all areas of the curriculum are connected. Languages and knowledge frameworks are used in this process of design to create and construct the built environment. The understanding of the inner and outer environments (Simon 1969, 1981, 1996), the patterns (Alexander 1979) and the explicit knowledge gained through practice (Schön 1983) are used to create the artefact (i.e., the project). These three theorists offer different positions on how the process of design is used as a means of understanding the world. However, it is not within the scope of this thesis to challenge these positions. Rather, this chapter focuses on the role of the core skills of critical thinking, communication and collaboration as a part of knowledge building through design. Language plays a critical role in the design process and is central to meaningful and effective communication. Some languages are common to people within a broad cross-section of society, others are specific to a certain group, such as design professionals. The nature of the collaboration within a design process depends on the background of those involved, their different experiences and their understanding of the world. When those involved in the design process are willing to reflect on their practice and experience, and think critically about their differing positions, understandings between different groups of people can be shared.

The National Standard of Competency for Architects presents the skills and understanding that are required of professionals (Architects Accreditation Council of Australia 2015). The framework defines how, in the process of design, the acquisition of knowledge across five domains can be demonstrated. Performance criteria define the critical skills in each of the nine elements of practice, in which architects’ knowledge and skills developed must be applied. This framework is used to inform programs in which professional skills are taught and demonstrated (e.g. creative problem-solving, effective visual, written and oral communication, and understanding in all the areas of cultural, social, environmental, technical, design and professional studies) (AACA 2015).
The accreditation process and the necessary regulation of the architectural profession has made it possible to generalise about architectural education. This generalisation becomes evident when studies, such as the one undertaken by Ostwald and Williams (2008) examine architecture schools across Australasia. Ostwald and Williams (2008, 130) determined that ‘architecture schools curricula are less diverse now than they were 25 years ago’, with the subject area of design studies accounting for around one-third of the curriculum. A similar trend, noted globally by Salama (2012, p. 10), is attributed to the primacy given to the design studies as the main forum for exploration, interaction and assimilation.

In addition to the structure of curricula Ostwald and Williams (2008) have addressed two other areas in their study—architectural academics and students, and the teaching and learning within schools. Their research has ensured that the discussion about architectural education includes the conflicting demands of academia and the profession, design as a priority, the structure and content of the design studio, gender imbalance and inequity, and the student experience (Ostwald and Williams 2008). Other studies, such as the one conducted by Nasar, Preiser and Fisher (2007), address the physical environment (i.e., the buildings and campuses), in which architecture is taught. They discussed the role the design of these buildings, and the ways in which these buildings are used, has in the education of future architects. These buildings serve as ‘living laboratories’, in which the performance of certain materials, construction and technology can be measured and understood, and the influence of spatial arrangement and social dynamics on behaviour can be examined.

However, sufficient attention in the literature on architectural education has not been given to the aspects of education beyond curriculum content and learning outcomes. The direction of this thesis was informed by my 2015 review of publications from the last 25 years listed in the Informit databases. I focused on the keywords ‘architectural education’ in the Education database and ‘education’ in the Architecture database. The outlines and summaries of these publications were analysed to determine trends in themes, approach and focus. The analysis described in Appendix A.3 highlights the differences between architectural research that focuses on education and education research that focuses on architectural education. Within the architectural research that focuses on education common areas of focus include educational content, the learning environments (e.g., typically built and educational), and the demonstration of discipline-specific skills and abilities. However, while knowledge and how others make meaning within the built environment were discussed, the role of worldview and

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8 The themes identified included discipline-specific knowledge and skills, the design of the built environment, descriptions of the learning experience, discussion of the learning outcomes, and pedagogical practices. The approaches used in the research published included case studies, differing methods of analyses, literature reviews and theoretical discussions.
the epistemological positioning of the architectural educational program itself was not often explicitly addressed in the literature. Education research that focuses on architectural education tends to focus on the relationship between two types of environments (e.g., the role of the built environment in education), a specific event or learning activity (e.g., the design studio), or a particular component of the curriculum (e.g., technology). Similarly, there is a gap in the education research regarding epistemological positioning.

The absence of sufficient literature on the epistemological positioning of architectural education is significant considering Kolb’s (1984, 37) assertion that to understand learning, we must understand epistemology—the origins, nature, methods and limits of knowledge—and that one’s epistemological position reflects the assumptions made about the world, and how one sees knowledge as being developed.

2.2 Epistemological Positioning and Worldview

Learning processes can become transformative exchanges, in which knowledge shared through interaction and experience influences the way in which individuals understand their world and the world of others. As these interactions and experiences respond to changes in the world, individuals’ understanding and worldview also shifts. This ability to meaningfully adapt to change can be supported by advances in technology and communication, but it is transformative learning experiences that prompt the shift in understanding and the way in which individuals view the world. In this discussion, epistemological positioning refers to individuals’ view of the world (i.e. worldview).

This thesis explores how knowledge is gained and meaning is made through learning. The two dominant epistemological positions of positivism and interpretivism are discussed to demonstrate how the epistemological positions of architectural education differ and what influence this has on learning. It is recognised that there are many more epistemological positions than those discussed in this thesis, and it is beyond the scope of this study to examine them all. Additionally, this thesis does not seek to offer an alternative epistemological theory. Instead, epistemological positioning is used to understand the nature of knowledge building within the learning process.

A positivist epistemological position describes the world as consisting of universal principles and observable facts. Objective knowledge is gained through deductive testing in which a clear theory is known from the outset, and data and evidence are easily compared (Shank 2008, 208). There is a clear set of rules that governs actions and outcomes, which can be measured and documented. The rules are inflexible and the direction cannot change.
Knowledge building does not uncover meaning that individuals associate to specific situations, as the rules are common to all and can be used to explain occurrences in all situations. Within this approach, human behaviour is understood as sets of causes and responses: therefore, human behaviour can be predicted, anticipated and directed. In the process of design, this ability to predict and anticipate can be important when ascertaining if a decision is likely to result in the desired outcome.

An interpretivist position considers knowledge as subjective and gained through inductive reasoning (Fox 2008). Theories and understanding are based on personal and individual interpretations of experience. As human behaviour adapts to differing contexts of experiences, an individual’s understanding of how and why things occur is subjective: their interpretation of events differs depending on their previous experiences. An interpretivist approach leads to socially constructed knowledge that is complex and dynamic. As the meanings and values made though individual experiences influences behaviour, observation and examination can be used to find meaning in human interactions; however evidence can be difficult to collect and validate. In the process of design, recognition that meaning is made based on interpretation of personal experience can lead to complex solutions that respond to a specific and unique set of circumstances.

As this thesis focuses on architectural education, it addresses primarily adult learning. Often by adulthood, individuals have established their epistemological position and worldview. Hofer’s (2001) study is relevant to this discussion about the personal epistemology of adult learning, as personal epistemology is becoming increasingly recognised in educational psychology. Hofer (2001, 361) proposed that that an epistemological position has two clusters of dimensions: first, the nature of knowledge (i.e., what one believes knowledge is), including the dimensions of certainty and simplicity of knowledge; the second, the nature or process of knowing (i.e., how one comes to know), including the dimensions of source and justification of knowledge. Students’ underlying beliefs about knowledge and knowing are part of their process of learning. As such, personal epistemology is an important aspect of metacognition in adult decision-making (Hofer 2001, 365). Individuals’ epistemological position explains how individuals resolve conflicting knowledge, evaluate new information and make fundamental decisions that affect their lives and the lives of others (King and Kitchener 1994; Kuhn 1991).

This thesis is concerned with how an individual’s epistemological position can change as a result of their learning experiences. More specifically, this thesis investigates how a student’s position on architecture, it’s role with the world, and how architecture is known, can change as a result of learning. Acknowledging the epistemological positions that underpin the learning experience is an important step towards understanding the role of architecture and
architectural knowledge. Examining architectural design and practice through an epistemological lens permits the exploration of the underpinning assumptions made about the world, the actions that take place within it and how knowledge of that world is developed within architectural education. The epistemological position of architectural education presents students with a worldview, and influences not only how architecture is practiced, but how it is learned.

Within architectural education, different subjects are often taught from different epistemological positions. For example, the technology subject areas often adopt a positivistic approach, while the culture subject areas adopt an interpretivist position. As all the areas of architectural education and curriculum come together in the practice of architecture, these differences in epistemological positions create conflict and a difficulty for students to consolidate their learning. Recognising and addressing these differences is one way of prompting transformation. An increased awareness of learning can be gained through reflection, sharing and effective communications. This awareness makes explicit the normally tacit elements of knowledge building. Additionally, students’ own awareness of their personal epistemological position can enable them to question, challenge, adapt and change their position, values, and behaviour.

As knowledge gained through learning influences our values, which in turn influences decision-making processes, the way in which we act in the world (i.e., our behaviour), is also influenced. Assumptions, either implicit or explicit, are made about what things do or can exist, the conditions of their existence, and the way they are related (Blaikie 2004b). The way in which we view the world can affect the relationships and interactions between self and others, how this worldview is developed, how knowledge is gained and how we place ourselves in the world.

Atkin’s (1999) research on learning and learning environments has influenced both educational and architectural practice in Australasia over the last 20 years. Focusing on the experience of learning, Atkin (1999) linked pedagogy with environment, learning with transformation and the capacity to learn with the ability to adapt and create. Of particular interest is Atkin’s use of Holt’s (1974, 20) model of the worlds we live in, which she used to explain the different ways in which knowledge is built through learning. In this model, there are four concentric worlds (see Figure 1). The innermost world is the world in which the understanding of self, values and beliefs occurs, which informs individuals’ decisions and actions. In this thesis, the innermost world is referred to as the ‘self-world’. The second world, which is physically and personally experienced (i.e., known directly), is referred to as the ‘known world’. The third world is the world that we know of or know something about, but
have not known directly or experienced. This world is understood through the experiences of others. This third world is referred to as the ‘known-of world’. The fourth, outermost world comprises all possibilities that have not been imagined yet. This is a world that can be difficult to understand and know, but it can inform and be informed by knowledge in the other worlds. This world is referred to as the ‘unknown world’.

Figure 1 The Worldview Models

Holt’s Four Worlds (left) and the Worldviews of This Thesis (right)

Source: Atkin (1999, 15; left) and author’s own (2015; right).

Atkin (1999, 15) adapted Holt’s (1974, 20) model to explain how students learn and how this learning can change values. Atkin reconsidered the boundaries between the worlds, and suggested that the transfer of knowledge from one world to the other may be easier. This thesis uses this model to explore how different ways of learning can transfer knowledge, informing, influencing and changing worldviews, and contributing to an understanding of others. This model of worldview is explained in greater detail in Appendix A.1.

When considered from an interpretivist position, knowledge of the world is constructed through the interpretation of experience—emphasis is placed on the known world. The direct experiences inform understanding of the world and self. This understanding can change depending on the nature of the experiences, and thus individuals’ understanding of their self-worldview is susceptible to change. Sharing an understanding of the known with others can be difficult and may rely on similar or shared experiences. Conversely, a positivist position gives emphasis to the known-of or shared world. The facts and principles, through which the known world is understood, are prioritised over personal experience or personal knowledge. These universal principles are applied to the known world and used to make sense of it, and thus inform the self-world, which shapes how individuals understand and respond to situations around them.
This model of worldview is used to identify the influence of epistemological positioning and worldview on the process of design and knowledge building. Simon (1969) adopted a positivist position; while different in their focus, the two sciences he identified were used to determine absolute rules, which directed the process of design. He believed that the ideal situation, in which the artefact is understood through the science of the artificial, diminished the need for understanding to extend beyond the known-of world. Simon (1969, 12) argued that if the abilities of the artefact to adapt and fulfil its purpose are understood, then minimal detail of the outer and inner worlds is needed. If a detailed understanding of the environments is reached, then a detailed understanding of how the architecture works may not be required. Therefore, it could be argued that minimal knowledge of the known world is required, if the known-of world is detailed, and is relied upon in the design process. Alexander, Ishikawa and Silverstein (1977, x) adopted a more interpretivist approach; their architectural language was constructed in response to experience and the social environment, resulting in a common understanding and meaning. Pattern language, a network of elements grounded in situations that frequently reoccur, can be used to design for common scenarios without repetition. Schön (1983) discussed a process that was interpretivist in its approach to learning, in that the values and decisions that were informed by personal experience were questioned. The process of reflection-in-action can be understood as supporting the transfer of knowledge from the known, real world to the innermost world of self, prompting development and growth in response to changing situations and contexts.

Similarly, this model of worldview is used to understand the learning process in architectural education programs. In architectural education, it is often necessary for different epistemological positions to be taken within a single program. It is difficult to have personal

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9 Alexander’s (1979) work has been influential in architectural education, through his direct involvement in programs such as the architectural design studios at the University of California, Berkeley where Alexander used these rules as a part of his pedagogy when teaching design. The seven rules of urban design were used by his students to guide the urban design process and to explore the process of design (Seamon 2006, 150). Alexander’s (1979) approach to patterns and language has been used in this thesis to inform the development of a language of learning experiences. This is discussed further in Chapter 4 alongside my discussion of my methods of analysis. His approach to the process of knowing building through experiences (both real and shared) has been used to inform this thesis’s discussion of the importance of sharing experiences and the languages and modes of communication used to do so.

10 Schön (1983, chapter 1) noted the rise of professionals within the workforce, the increasing reliance on the specialised knowledge attributed to them and the emergence of a ‘knowledge society’ organised around professional competence. This corresponded to a crisis of confidence, both of the professionals and within the professions themselves as fluctuating workloads, conflicting demands, and certain practices brought into question the opportunities for improvement of social wellbeing in question. At the core of this crisis, Schön (1983, 20) noted that ‘we are bound by an epistemology of practice that leaves us at a loss to explain, or even to describe, the competences to which we now give overriding importance’.
experience of all design project types, personally understand the full depth of complexities of
the various places to be designed, or consider the full range of possible uses of the spaces
designed. Therefore, in some cases a positivist position is taken, wherein developed rules
govern how certain design decisions may be made. In other cases, the designer may rely on
their own experiences to plan for, design and create experiences for others. Communication
skills—the means of effective and meaningful sharing of experiences—determine how well the
known and known-of worlds can be understood by the designer. The collaboration of people
with a range of experiences can enrich the design process. The sharing of these diverse
experiences can prompt designers to think critically about their own experiences, the
knowledge they have and may prompt a challenging of the assumptions that govern their
design and decision-making processes.

Atkin (1999, 17) acknowledged the difference between knowing-of and knowing, and
recognised the importance of balancing experiences of and in both. Our understanding of the
world, and the events and situations that occur within it, shapes the values and attitudes that
direct our decision-making influences our behaviour and actions. Therefore, behaviour—the
actions and activities that occur in response to a specific situation (Williams 1983, 44)—are
informed by what we know. If what we know is developed through learning, then we must
consider how ideas and beliefs can be transformed through learning.

2.3 Learning as a Means of Transformation

Learning has been defined in this thesis as the development of knowledge through
personal experiences and relationships that is acquired through interaction. The nature of
learning can vary because the way in which experiences are interpreted and the types of
interactions that occur differ and there are many different positions offered on the types of
learning. Following the emergence of psychology as a discipline independent from biology and
philosophy, learning theory has become a specific field of inquiry (Ashworth et al. 2004). The
framework offered by Ashworth et al. (2004, 2), developed as an aid for researchers in higher
education, explored many positions. The five key orientations of learning have been defined as
behaviourist, humanist, cognitivist, social learning and constructivist (Ashworth et al. 2004).

The call for change in architectural education, discussed in the Introduction to this
thesis, aligns with the underpinning rationale for these learning theories: there is constant
change in our world and there is a subsequent need for meaningful responses to this change in
regard to in the way we learn. These learning theories11 have influenced the direction of

11 These learning theories are described in more detail in Appendix A.2.
learning, especially in higher education, in different ways. The effect of behaviourism on architectural education is demonstrated by the inclusion of behavioural objectives and performance-based outcomes within the curriculum, and the emergence of competency-based (rather than knowledge-based) education. Simon (1969, 17) suggested that as part of the iterative design process, simulation is used as a technique for achieving understanding of the designed artifice. In architectural design studios, students demonstrate design skills through the way in which models and drawings have been used to determine whether a design ‘works’ in the given environment. Cognitivism has shifted teaching away from the teacher-centred approaches: group-based learning and applied practice has become integrated into the learning experience. Schön (1983, chapter 3) noted the constructivist process was often demonstrated in architectural design studios wherein a teacher described the process of design to the student as it took place. In doing so, the design and the design-making process was made explicit; additionally, through this experience, the skill of reflective practice is learned. Social learning theory and humanism has given rise to the inclusion of peer learning within the tertiary environment (Ashworth et al. 2004, 8). As a result, experiential learning, the social contextualisation of learning and reflective practices have emerged within tertiary environments, including architectural education. Alexander, Ishikawa and Silverstein (1977) documented a social learning approach in Alexander’s own teaching practice, in which the role of language and common understanding was used not only to produce architectural outcomes, but also to explore the process of design (Seamon 2006, 150).

The learning theories of behaviourism, humanism, cognitivism, social learning and constructivism, and the theories of architectural education of Simon (1969, 1981, 1996), Alexander, Ishikawa and Silverstein (1977), and Schön (1983) have developed in relative proximity to each other. It is telling that these theories occurred around the same time, despite approaching learning from different fields of research. It demonstrates not only the complex and diverse nature of learning, but also the oscillating nature of architectural education. However, within each of these positions the core skills of critical thinking, communication and collaboration play a central role, although collaboration is the least present. The nature of learning, and the way in which progress is assessed through individual assessment, can make the collaboration challenging to teach explicitly and difficult to identify in learning. Collaboration is easily prompted, through group work and projects, but the skills needed (e.g., negotiation, conflict management, respecting ideas and positions of others, and contributing to the development of others) are not often explicit within an architectural curriculum (Rhodes 2009).
Transformative learning can prompt a change in behaviour by changing students’ unspoken values that underpin their decision-making processes, ultimately catalysing a shift of self-worldview. According to Atkin (1999, 16) ‘transformative learning involves constructing and reconstructing our own meaning in the world’. The processes of meaning making—developing understanding and constructing belief through experience—are particularly relevant in the context of this study. Tertiary students typically find themselves in a period of change; for many, their world is full of new experiences. However, experiences in architectural education, such as those that are behaviouristic or cognitive, are transmissive. Knowledge, information, ideas and skills are taught through purposeful telling, demonstration and guidance. Such activities focus on the development of knowledge and skills. As such architectural education often reinforces students’ current worldviews—known-of, known, and self—without challenging them. Alternatively, architectural learning is understood as a means of prompting and supporting a repositioning of worldview, with the aim to change the understanding of how people relate to the environments in which they live.

Taylor’s (1997, 45-49) review of literature investigating models of transformative educational practice identified four critical elements that were supportive of transformation and are more likely to lead to change. Transformation is often prompted by a disorienting dilemma (i.e., an acute internal/external crisis, or an occurrence of disequilibrium that challenges values and the self-worldview). The environment, including the social and physical surrounds of the learning experience, can magnify this discomfort. It is through critical reflection that meaning is made; through the reassessment of values, the self-worldview is adjusted. The interactions, including the sharing of experiences that occur through collaborative relationships and meaningful communication, provide a way of understanding the known-of world and the known world of others, which ultimately reinforces a shift in worldview.

Disorienting or disturbing dilemmas can be unusual, unexpected, uncomfortable, unsatisfying or unfamiliar experiences and situations that challenge abilities and skills, and prompt development and new skills. These experiences can be a single event, or unfold over time (Taylor 1997, 45). Often this disturbing dilemma is supported by a catalytic experience (such as opportunities to practice the new skills and abilities), or repeated experiences or occurrences of the unusual or unexpected, which confirm and reinforce the transformation. In some cases, the dilemma is experienced as an integrating circumstance—a period in which individuals search, consciously or unconsciously, for something that is missing in their life. Finding this missing something is the catalytic experience. However, not all dilemmas lead to transformation. Often the presence or occurrence of other elements is needed.
Transformation is supported by a common language as understanding is developed through experiences in shared environments. The transfer of understanding from the known-of world to the known world suggested by Atkin (1999) occurs when experiences are shared in a language that is known to all. Architectural students learn discipline-specific languages, which are used to convey certain meanings. However, this focus on discipline and the like-mindedness of the individuals within their architectural communities may limit students’ potential for transformation. The experiences they share may not significantly differ and as such, students may not be exposed to different interpretations and meanings. In addition, architectural language—drawn, written or spoken—is not necessarily easily read by those outside of the discipline and the intended meaning may not be understood. This lack of understanding by others may be the disturbing dilemma that prompts transformation, but students must have a predisposition for change (Taylor 1997, 45) and have the ability to change.

Atkin (1999, 15) also stated that transformative learning occurs as a result of dynamic interaction with others. This requires not only the reviewing of and reflecting on currently held beliefs, but also the sharing of information with others to collectively develop knowledge, language and skills. This dynamic interaction, meaningful communication and collaboration with others can have a positive impact felt by all involved, not only the individual learner. Further, this experience can result in a connection with the world beyond the boundaries of self. Such connections are developed through social interactions, in which experiences are interpreted in different ways and new meaning is made. This variety of interpretations and new meanings expands the individuals’ self-worldview, as knowledge is transferred from the known-of worlds, through the known world, to transform the self-worldview. This new or revised interpretation of experience—also called ‘perspective transformation’ (Taylor 1997, 49)—is important as it is this transformation that influences further action and interpretation of future experiences.

Critical thinking and reflection are the skills that will provide students with this ability to change. The relationship between reflection and meaning perspective (i.e. the frame within which meaning takes place), is complex; this is because previous experiences inform our understanding of the world and our beliefs. According to Mälkki (2010, 46), ‘reflection refers to becoming aware of and assessing the taken-for-granted assumptions within one’s meaning perspective, to construct a more valid belief’. Critical self-reflection is essential to establishing their position of and within this world. Self-reflection—the metacognitive application of critical thinking to one’s own thinking, feelings and actions—involves the assessment of assumptions. Such reflection can create tension, as it challenges the very mechanism by which meaning is
made. Reflection is not a purely rational process, but can be threatening and emotionally charged (Mälkki 2010, 47-47). For architectural students, the process of designing collaboratively can provide an environment in which new ideas can be discussed and the reconstructing of meaning can be positive. Doing so requires the skills needed for collaboration to be made explicit, and the challenging nature of the reflective experience to be recognised and respected.

Over the last 50 years, theorists such as Buchanan (2102), Dutton (1987, 1991), Llewellyn-Davies (1960), Nicol and Pilling (2000), and Slessor (2012) have persistently called for architectural education to explicitly address the development of the core skills of critical reflection, communication and collaboration. Designers must develop these core skills to understand how they view their world and make sense of their own experiences and the experiences of others. Transformative experiences in architectural learning are those in which critical reflection of values and beliefs, sharing of experiences with others through meaningful communication and the collaborative process of design can challenge and shift personal worldviews. This thesis discusses how the key elements of transformative learning can be found in architectural education and identifies learning experiences in which transformation is supported. However, it is difficult to identify where these skills are explicitly developed within typical architectural education. As such, an alternative method of examining architectural education is needed. In Chapter 3, methods of understanding the complex process of architectural learning are discussed, using different criteria of analysis to those currently used to examine architectural education programs. Architectural learning is framed as a dynamic system comprising different contexts and interactions between various stakeholders, including students, staff and the community, which broadens the scope of the analysis and understanding of transformation.
CHAPTER 3: UNDERSTANDING ARCHITECTURAL LEARNING

In this thesis, architectural education programs are explored as a means of shifting the values and worldviews of graduates. Global ranking methods are tightly focused on assessment of a programs ability to meet student needs and professional expectations. However, architectural education programs can be viewed differently using the organisational framework of system of learning. The elements of the systems of learning (i.e., the multiple contexts of learning, the people involved and their roles, and the interactions that occur) can be defined for individual architectural education programs. A broader view can be taken when the contexts of learning (i.e., the built, natural, social and educational) and the people involved (i.e., the students, staff and communities) are documented. As such, the capacity of architectural education to shape the values that influence everyday behaviour is made visible.

Within this system of architectural learning, interactions take place that position students to respond to change and thus, prompt students to change their worldviews. Climate-responsible designers learn necessary skills—critical thinking, communication and collaboration—in formal architectural education programs, and these skills shape their understanding of the dynamic relationship between people and changing environments. When these learning experiences are transformative, students’ worldviews are challenged and shifted. However, the literature is unclear about how these skills can be explicitly developed within the complex process of architectural education, or how transformative learning experiences are provided. This chapter will discuss why it is important to acknowledge that the typical assessment criteria in architectural education programs do not explicitly recognise these core skills, although demonstration of the resultant understanding is often required. While the different environments for learning (e.g., the built, natural and social) are typically recognised, the impacts of the transformative nature of the experience are not. Transformative learning experiences require teaching practices different to those that are typical in architectural education. In this chapter, alternative methods of documenting and analysing architectural education are introduced. These documentation and analysis methods highlight skills that encourage learners to shift their worldview.

3.1 Current Practices in Architectural Education

Global rankings are often used by universities to promote the quality of their higher education programs. One ranking system, the QS TopUniversity Ranking System (2014) assesses four broad areas: research, teaching, professional and international outlook. Highest
priority is given to research, based on research outputs of the staff and citations per faculty. Teaching quality is the second priority, assessed using the staff-student ratio. Other criteria include employer reputation (based on a global survey of graduate employers), and the diversity of the learning and teaching community (measured by the proportion of international staff and students). It is acknowledged that the intent of these procedures is to provide a benchmark for comparison and assessment, not to determine what constitutes good pedagogical practice.

Accreditation systems also consider the outcomes of architectural education programs and examine the demonstration of key skills and capabilities. Programs are accredited by their national bodies, and these bodies may members of the International Union of Architects (UIA). As such, there is similarity and consistency in the structure and content of architectural education programs internationally, as accreditation procedures and UIA membership ensures that the objectives of architectural education are generally aligned (UIA Education Commission 2011). The observations made in this thesis regarding current practices in architectural education are derived from my professional experiences of teaching in one program for over 10 years, as well as the insights I have gained through my visits to several architectural education programs in Australia. Therefore, the Australasian accreditation process is used here to describe how architectural education is typically examined. In Australasia, the accreditation process examines the content and structure of the program, the facilities in which the programs are conducted, the outcomes produced by students, staff profiles and student satisfaction. In doing so, evidence of the application of communication and collaborative skills is assessed. Meetings with staff and students are used to gauge the nature of the experiences within the program and identify evidence of critical and collaborative practices. However, the accreditation process is used not as a determination of best practice, but as an assessment of minimum professional requirements. The skills of critical reflection, communication and collaboration are embedded within the criteria; these are employed by students to produce the outcomes examined. These descriptions have been informed by the research of Dave (2004), Ostwald and Williams (2008), Buchanan (2012) and Salama (2012).

The way in which the core skills are learned, and the experiences in which they are developed, is not explicitly addressed in accreditation procedures as this sits outside the scope of the benchmarking process. Additionally, it is unclear how the criteria used to determine rankings, which focus on research, relate to learning experiences within an institution. To identify how architectural education can better support climate-responsible knowledge building and skill development, alternative methods to those used for ranking and accreditation procedures must be applied. Global rankings and accreditation procedures focus
on the outcomes of architectural education, rather than teaching practice and learning processes within the programs. It is not the intent of these procedures to determine what constitutes good pedagogical practice, but rather to provide a benchmark for comparison and assessment. However, the epistemological positioning and worldviews held by those participating in the architectural education programs can affect whether the learning that takes place reinforces existing values or transforms them. Different approaches to learning can make explicit the development of the core skills of critical thinking, communication and collaboration. The understanding gained and knowledge built through learning can prompt transformation when it is learned in circumstances that are uncomfortable or challenging, in environments that are diverse and is supported by the connections between the people involved.

An epistemological position reflects one’s assumptions about the world, and about how knowledge develops (Kolb 1984, 37). When looking at architectural education programs, acknowledging their epistemological positioning assists in understanding how students within these programs develop their architectural knowledge, and how their assumptions are shaped. However, architectural education programs are not often considered in this way, and while epistemological positioning may be explored as part of the curriculum, it is not often explicit in discussions about how architectural education occurs. Understanding the epistemological positioning of an architectural education program is an important step towards understanding the learning within the program as worldviews are informed by learning. As such, the values and beliefs of the self-worldview developed through learning can influence actions and decisions within the design process. When there are contrasting worldviews, it can lead to confusion for both staff and student; conflicting assumptions about the nature of knowledge and meaning can result (Kolb 1984, 29). However, acknowledging this confusion can prompt transformation and resolving the conflict can catalyse a shift in worldview.

Students’ understanding of the world is shaped by their capacity and ability to learn. Students rely on their capacities and abilities to make sense of direct or vicarious learning experiences. Supporting the different capacities and abilities empowers students to respond meaningfully to an event or situation, as students’ needs influence their development of knowledge (discussed in detail in Appendix A.2). Limited ability can affect the students’ capacity to understand their learning experiences. Some abilities (e.g., linguistic, mathematical and personal intelligence) are acknowledged in typical assessment procedures in both school and tertiary education. Other abilities (e.g., emotional, spatial, practical and social) are not consistently recognised in the curricula of architectural education programs, and are often not explicitly targeted during the learning process. However, it is important to recognise that
abilities can be different to ensure the effective and comprehensive development of knowledge for all students.

Students’ abilities, beyond the academic skills and abilities expected, can be identified in current architectural education practices using mapping and documentation methods. These methods include mapping the multiple learning contexts of the program; documenting the interaction between those involved; defining the types and roles of people, the epistemological positioning of the program and the assumed skills and abilities expected of students; and the description of the visible learning processes (see detail in Appendix B.1). Once identified, different abilities can be accommodated by considering the process of learning and the pace at which learning happens. When the people involved in architectural education come from different backgrounds, or include different groups or communities, these different abilities can be accommodated in the learning outcomes. The process of learning can be made visible by displaying or exhibiting the outcomes, or conducting learning activities in common areas.

In this thesis, a distinction has been made between education (i.e., the transmission of knowledge) and learning (i.e., the acquisition of knowledge through experience). Discussing epistemology, abilities, process and outcomes shifts the focus from architectural education to architectural learning and acknowledges the broader contexts of these learning experiences. This thesis explores learning experiences further through the development of a framework for architectural learning that presents an alternative way of understanding architectural education.

3.2 A System Framework for Learning

In this thesis I argue that there is a need for change in architectural education. This argument echoes Buchanan’s (2012, 91) statement that architectural education is failing to engage with critical realities. To respond to global changes (e.g., climate change), designers of the built environment must develop an awareness of the multiple environments and an understanding of the diverse range of needs and behaviour to be accommodated. In recognition of the dynamic nature of architectural learning, a system model has been developed to better understand the key elements of the learning experiences and the capacity to support this change.

Since first proposed by Parsons and Shils (1967), systems theory has influenced our understanding of how complex structures and processes change as a result of actions and interactions between elements. Parsons and Shils (1967) developed their general theory of
action, or systems theory, to understand human action within a social group and how this action can lead to social and behavioural change. As current thinking about sustainability is more usually presented from scientific, rather than a sociological point of view, this theoretical positioning is important for understanding the role of human behaviour in climate change, and how learning can contribute to behaviour change. Parsons and Shils (1967) determined that actions (i.e., behaviour) occur within a dynamic and interacting system as a means of attaining ends (i.e., goals). These actions are initiated and contained within a situation and the situation changes as a consequence of the action occurring. The system of learning that has been developed is also understood as dynamic and interacting, wherein the interaction that takes place (i.e., the learning) is a means of attaining change or transformation.

Systems theory has been applied in both science and social science to better understand the relations, actions and change within complex organisms. Ecological environments can be understood as systems of highly complex sets of conditions of adjustment, which change as a result of the actions and interactions that occur within the system to adjust to external changes (Hawley 1950, Chapter 1). A systems approach has been used by social ecologists to forecast the outcomes likely to occur in response to uncertainty and rapid change in society and environment. For example, in their series of essays exploring the theory of social ecology, Emery and Trist (1975) applied their understanding of society as a system to predict the social change that occurred as a result of the second Industrial Revolution (1870-1914). As it can take time (i.e., years) to identify the impact of social change, being able to predict the likely outcomes meant that behaviour within the social systems could be better understood (Emery and Trist 1975). This finding is relevant to the discussion in this thesis because the significance of impact of the behaviour of individuals on climate change is often challenged in the larger global context. Additionally, the long-term consequence of the actions of individuals is difficult to determine. The application of a systems approach to learning supports the exploration of the role of education in supporting sustainable behaviour, as it recognises the complexity of interactions and situations and the potential for change.

Research within the field of active environments also suggests that the context in which the actions occur is important (Giles-Corti and King 2009, 110). When considering the society at large, there are many environments that influence action. When researching the impact of built environment on physical action, Giles-Corti and King used system theory to discuss how negative effects could be mitigated and thus, encouraged an interdisciplinary approach to the design of the physical environment. They suggest that ‘the built environment alone may be necessary but not sufficient to promote physical activity, given that many factors
influence behaviour’ and that ‘the interaction of individual components within a complex whole’ must be examined (Giles-Corti and King 2009, 110).

Systems theory has also influenced the ways in which architectural education is considered. Alexander, Ishikawa and Silverstein (1977, xiii) recognised that the holistic behaviour of the social structures (i.e., groups), the parts within these structures and the interactions between these parts were critical elements of the physical environment in which this behaviour took place. Forty years later, in 2003, Dutch architect John Habraken (2003, 18) argued that knowledge about everyday environments must be taught to students. Thus, designers must have an understanding of the relationships between multiple, dynamic environments.

This thesis proposes that to better understand how architectural learning can transform worldviews, it must be defined as a dynamic system in which multiple environments and diverse stakeholders interact to create change. However, the term ‘environments’ can have different meanings; the interchangeability of terms such as ‘environment’, ‘situation’, and ‘contexts’ may be misleading. In this thesis, ‘environment’ is used when describing specific surroundings. ‘Situation’ is associated with events and occurrences, relating to both the environment and the people involved. ‘Context’ refers to a broader point of view, which can extend beyond the immediate or physical environments to include the educational.

This thesis defines four contexts of learning: the built environment context, the natural environment context, the social context and the educational context. The built environment (i.e., the man-made physical context of learning) includes formal settings (i.e., schools and other learning institutions), as well as the everyday built environments in which informal learning takes place. The natural environment is more typically an informal learning environment, experienced in the everyday, although some formal learning programs use the natural environment as the context for learning activities. The social context of learning (i.e., the people with whom the learning is experienced), can, at its broadest level, involve entire communities. This social context has come to the fore in learning theories, such as the application of social behaviourism to learning (Blumer 1969) and the emergence of communities of practice in learning (Wenger 1998). The educational context of learning incorporates the curriculum and content of the learning, as well as pedagogical approach of the learning experience. When discussing learning experiences and change in practice, it is this context that is emphasised in architectural education research.

The consideration of the multiple environments or contexts of learning is not an unusual one. The term ‘learning environments’ is used to refer to the social, psychological or physical environments in which learning takes place (Cleveland and Fisher 2014, 1). The
interaction between the physical and social environments has been the focus of human geographers such as Soja (1989), Lefebvre (1991), McGregor (2004) and Massey (2005). The influence of the built environment on learning is becoming increasingly understood through the work of organisations such as the Organisation for Economic Co-operation and Development (Organisation for Economic Co-operation and Development 2009). However, as evidenced in the review of architectural and education research (included in detail in Appendix A.3), architectural education is typically focused on one or two contexts—usually the built and the educational contexts—and the interaction between them. The systems approach proposed in this thesis addresses this by recognising that learning can take place in multiple contexts concurrently: the relationship between these contexts, those involved and the actions is complex and dynamic.

To define these contexts, it is important to acknowledge that some of the characteristics and elements within these contexts relate to, or are similar to, other contexts—that is to say, there is some overlap (see Figure 2). They cannot be defined as discrete areas of focus because interactions take place within one or more of these contexts simultaneously. Figure 2 illustrates not only that these contexts may overlap, but also that one context may be prioritised over others within an architectural education program. In Figure 2, the natural context has highest priority, followed by the educational context, then the social context, then the built context. These overlapping contexts are important when considering the people involved in the system, as an individual may act, and interact, in more than one context.

![Figure 2: The Contexts of a Learning System](source: author’s own (2011))

Within the learning system, three main types of people have been identified. First, there are those who are the primary focus of the learning experience (i.e., students or learners). Often they are described as ‘novices’ because of their fledgling knowledge and skills. The term novice is not associated with age, but with a stage of knowledge and skill
development, and experience. Second, the learning system also involves instructors or teachers, who play a critical role. Teachers are sometimes referred to as ‘facilitators’ of the learning experience. They are the experts—they have experience within the field of knowledge and possess a high level of skill. Again, this characterisation is not associated with age, but experience. Typically, novices and experts are easily identifiable in architectural education programs. However, these roles are fluid and when considered longitudinally over time, there are points at which an individual can be either a novice or an expert. The need to update knowledge and skills throughout a career or lifetime requires adaptability, flexibility and versatility (Nicol and Pilling 2000, 1). This adaptability requires a shift in role, and subsequently a shift in worldview, as new ways of thinking are developed. Additionally, a horizontal relationship between teacher (facilitator) and student (participant), can exist (Singh 2013). Both roles could be held concurrently where a participant is an expert and a novice and in the process of helping others (learners) to transform, is often transformed themselves.

The third type of person participating within a learning experience, although they are often not recognised, is the social group or community. Communities are the social groups who are affected by architectural outcomes. They comprise the various learning groups of students, cohorts, or the architectural professional community. There are many definitions of the word ‘community’, ranging from use that indicates actual social groups, to referring to a quality of relationship. (Williams 1983, 75-76). In this thesis, ‘community’ refers to a group of people who share common knowledge, experiences and language(s). Individuals within these groups are like-minded, share values and attitudes, and hold similar epistemological positions. Commonly, communities comprise individuals who live or work within close proximity or interact closely. It is important to recognise that within a community current common knowledge and values may not have existed in the past: individuals within a community may come from different backgrounds and have different prior experiences. This is often the case in architectural education, in which student cohorts develop common knowledge, experience and language focused on the architectural discipline and the design process. In this way, the community is intertwined with the social context of learning. In this thesis, community is also considered an active participant who interacts with others within the learning system. Communities can be used as a resource within the architectural educational context by providing another level of complexity to a design problem (e.g., informing, but not actively participating in the architectural learning experience).

The results of the interactions that take place within the system change the elements of the system. This change then affects the interactions that take place in one or more of the contexts, evident in the behaviour of those involved. Often the relationship between the...
contexts and the people, as well as between the individuals themselves, can contribute to the ongoing change within the system. Walden (2009) noted that there are many aspects that influence the experience and behaviour of people as they interact with their environment. Walden (2009) recognised that in the past, environment determined behaviour and that there existed a law-like causal relationship between the two. However, it is difficult to isolate cause and effect, due to the multiple variables of both the environment and the behaviour, and the complexity of their relationships. Walden (2009, 3) stated that ‘individual behaviour is not only determined by the social and physical environment, but the individual in turn changes reality by his or her behaviour’. It is this iterative nature of the relationships that makes the system dynamic.

Francis and Hester (2004, 24) proposed that understanding social systems requires an investigation of ‘the methods by which members of society are able to observe and recognise what is happening around them, and thereby know what they should do to fit their actions together with the actions of others’. Making sense of the world is not detached from action, but rather something that is made in action. Understanding how we learn to make sense of our world by being active in the world will lead to an understanding of how behaviour can be changed through action. To better understand how meaning can be made in architectural education, this thesis discusses how interactions that take place between those involved within a system of architectural learning can be observed. The focus of analysis is shifted from the learning outcomes used to assess competency, to the process of learning, through which the core skills of critical thinking, communication and collaboration are developed. To explore the process of architectural learning, the methods of documentation developed in this thesis are applied to case studies of architectural education, and transformation becomes recognisable. However, recognising and identifying transformation can be challenging as it may not be evident immediately. As previously noted, it can take years for transformation to manifest and become visible, although the methods of documentation have made certain long term changes in the case studies of architectural learning more apparent.\(^{12}\)

3.3 Transforming Worldviews in a System of Learning

In formal learning environments (e.g., schools and universities), curricula structures are designed and implemented, learning is scaffolded, and knowledge and understanding is developed and measured. This is evident in the structure of architectural education programs, wherein skills and knowledge are developed as the complexity and scale of the projects

\(^{12}\) The methods of documentation are described in Appendix C and D.
designed and discussed increases. The development of skills and knowledge determines an individual’s worldview, through which experiences are processed and situations and events are understood. Yet, as education becomes more focused on developing skills and understandings required for potential futures, the development of skills and knowledge becomes increasingly disconnected from everyday life, limiting the application of the learning to everyday behaviour. In effect, the known-of world becomes disconnected from the known world. Recognising and providing opportunities for informal learning in everyday experiences can increase the self-awareness of learning, prompt transformation of worldviews and initiate a change in behaviour.

In Holt’s (1974) description of the worlds in which we live—the self-world, the known world, and the known-of world⁴³—experiences and understanding are directly linked. Experience of events and situations in the known world informs and influences individuals’ beliefs, values and expectations: their self-worldview. The term ‘experience’ implies a direct participation and physical engagement in events or situations. However, this experience could be indirect or vicarious: knowledge of the known-of world is gained through learning of the experiences of others.

The learning process can contribute to the transfer of knowledge from one world to another. When the thresholds between worlds are permeable, the extent of understanding and meaning expands by sharing direct experiences through effective communication. Impermeable thresholds—when the methods of communication limit awareness of the other worlds—can impede development, as the understanding of one world is less likely to be influenced by that of another. The process of transferring knowledge from known-of world to known world is a cognitive process, whereby the application of an abstract theory is applied to a known or observed situation, event or experience. The transfer of knowledge from the known world to the self-world is a more metacognitive process, requiring an awareness of self and values, and an understanding of how these have come to be, and thinking critically and challenging this understanding. Critical to this process is the students’ motivation to learn and change.

Maslow’s (1943) Hierarchy of Needs has been adapted by Koltko-Rivera (2006) and used to inform an understanding of how the motivation to change (see Table 1). Maslow’s original hierarchy culminated in self-actualisation and the fulfilment of personal, individual potential (Koltko-Rivera 2006, 303). It could be argued that assessment processes within architectural education satisfy this need and a students’ motivation is driven by this need.

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⁴³ Additional explanation of this model of worldviews can be found in Appendix A.1
However, Maslow himself reconsidered the hierarchy and recognised that ‘a fully developed human working in the best conditions is motivated by values which transcend his self ... transcending the geographical limitations of self’ (Maslow 1971, 4). Koltko-Rivera (2006, 303) described this self-transcendence as seeking ‘to further a cause beyond the self’.

Table 1: Maslow’s Hierarchy of Needs (extended)

<table>
<thead>
<tr>
<th>Motivational level</th>
<th>Description of person at this level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-transcendence</td>
<td>Seeks to further a cause beyond self and to experience a communion beyond the boundaries of the self through peak experience</td>
</tr>
<tr>
<td>Self-actualisation</td>
<td>Seeks fulfilment of personal potential</td>
</tr>
<tr>
<td>Esteem needs</td>
<td>Seeks esteem through recognition or achievement</td>
</tr>
<tr>
<td>Belongingness and love needs</td>
<td>Seeks affiliation with a group</td>
</tr>
<tr>
<td>Safety needs</td>
<td>Seeks security through law and order</td>
</tr>
<tr>
<td>Physiological needs</td>
<td>Seeks to obtain their basic needs</td>
</tr>
</tbody>
</table>

Source: Koltko-Rivera (2006, 303)

Where self-actualisation refers to the desire for self-fulfilment, it is through self-transcendence that a person experiences a sense of identity beyond the boundaries of the self. For example, this can be achieved through one’s interaction with nature or prompted by aesthetic experiences. The model of the worldview presented in Chapter 2 and Appendix A.1 places the self at the centre, and defines the worlds in relation to this self-centred view. The self-transcendence referred to by Maslow (1943) suggests it is possible to look beyond of the self and known worlds, to the known-of world, including the known world of others.

Transformative learning provides experiences in which the learner can move beyond experiences of self, and recognise themselves as belonging to or with others. In reviewing Maslow’s (1943) Hierarchy of Needs, Krathwohl (2002) recognised that transformative learning requires higher order levels of thinking and understanding. However, the motivation to meet these higher order needs arises only once other lower order needs are met (Krathwohl 2002; Maslow 1943) and the learning experience must be successfully transmissive in the first instance. Therefore, any changes made to the learning experience cannot come at the expense of meeting the educational needs of development of information and knowledge, skills and recognition of learning.

Both Holt (1974) and Atkin (1999) argued that sense is made of the world and knowledge is built through direct experience, but the extent to which the world can be experienced directly can be limited through lack of opportunity or motivation. However, through effective communication with others about their own direct experiences, the
motivation to experience the known-of world is increased. Attempts to share experiences and communicate in various modes influence the way in which others perceive and understand our real world, and the extent to which we can understand the real world of others. The success of the communication is critical to the transfer of knowledge from the known-of and the known worlds. Aktin (1999, 15) asserted that the individual is more likely to be motivated to learn and experience directly when there is engaging and effective sharing, and the ability of the self to understand and be inspired. This learning serves to shift knowledge from the shared to the real world. However, if the communication abilities are not suitably developed or present, or the language used by the one is not aligned with the literacy of the other, then the threshold between the worlds becomes impermeable and it is more difficult for knowledge to be transferred. Similarly, if the transfer of knowledge between the known world and the self-world is limited, then growth of the self-world is also limited. This growth, though skill development and knowledge building, is recognised as a key characteristic of learning. Permeable boundaries are critical in supporting the transfer of knowledge from one world to the other so that learning can challenge current values and prompt change.

When considering his own teaching practice (in non-architectural learning), Kolb (1984, 37) suggested that the nature of the subject matter itself can be used to determine the best method to help students learn. To do so, the nature of the learning experiences themselves must be understood, as well as the content and skills to be learned. Dutton (1991), in his introductory discussion on architectural education and pedagogy, noted that the practice and theoretical development of architecture is often prioritised as more important than the practice and theoretical development of education by those involved in architectural education programs. This is evident in many of the discussions around architectural education, in which what is taught and who is teaching are the primary foci (Buchanan 2012; Ostwald and Williams 2008; Zhener et al. 2009). Other discussions have focused on the environment in which architecture is taught, for example the Royal Melbourne Institute of Technology Design Hub, (Engberg 2013), the Melbourne School of Design (Syrkett 2014), and Lee Hall at Clemson University in South Carolina.

When discussing the role of design and research in environmental (architectural) education, Dave (2004) noted that as a social science, there are many arguments for what constitute core or foundations skills in architectural education. Dave (2004, 89) cited Simon’s (1969) characterisation that ‘design is concerned with how things ought to be. And what ought to be in environmental disciplines is intimately tied with human choices and values’. In doing so Dave (2004, 89) noted that ‘spatial disciplines … not only reflect but also manufacture new values in anticipating changes and times ahead’. It is this creation of new values and their
relationship to the discipline of architecture that is of interest when arguing for a program that supports behaviour change.

Within a dynamic system of architectural learning it is not only skills and knowledge of architecture that are being learned. The skills needed to adapt to changing situations and the new understanding required to influence future positive change should also be learned. This thesis proposes a framework for a system of learning (see Figure 3), within which learning in multiple contexts – the built, social, natural and educational – supports development of new knowledge and understanding. The people within this system – the staff, students and communities – act as participants and agents of the transformative experience. These people rely on the development of core skills to develop new understandings as they critically reflect, collaborate with others and communicate within and beyond the system. Diverse modes of interaction influence how people behave, share experiences, relate to one another. Different points of view inform the new meaning that is made.

![Figure 3: A Framework for a System of Learning](source: author’s own (2015))

The next chapter demonstrates how this understanding of architectural learning as a system can inform the documentation of the development of core skills, the interactions that take place within the system and the gaining of understanding of self and others. The methods of measuring architectural education discussed acknowledge the learning process as well as outcomes, identify the relevance of the learning to the professional and academic community and record the context in which the learning occurs.
CHAPTER 4: METHODS AND TOOLS: FINDING EVIDENCE OF CHANGE

Transformative experiences in a system of architectural learning, by their very nature, can be difficult to document. In this chapter, the system framework for learning discussed in Chapter 3 is used to document selected architectural programs using the mapping and diagramming methods described in Appendix B.1. These methods document the multiple contexts of the system, the interactions of those involved, the epistemological positioning of the program, the abilities of students, and the visible learning processes. However, this documentation doesn’t capture the transformation that can occur in a dynamic learning system. Additional methods of documentation have been developed to capture the elements of a dynamic learning system in different ways, each requiring a unique mode of analysis. The contexts of architectural learning are defined using reflective analysis of maps and photographs. The worldviews of individuals are modelled through narrative analysis of interviews. Acquired immersion—being immersed in the situations, contexts and events while visiting an architectural education program for a length of time—enables observations of interactions within the system of architectural learning. The documentation of these observations are analysed to determine how and where the core skills of critical reflection, communication and collaboration are developed. The findings from the analysis of the documentation created using these methods has been organised and coded to define characteristics of elements of transformative experiences in architectural learning.

4.1 Architectural Education as a System of Learning

Architectural education can be considered a dynamic system of learning that has the capacity to shape the values that influence everyday behaviour. The global rankings and accreditation procedures discussed in Chapter 3 assess architectural education programs according to their ability to meet students’ needs and professional expectations. However, the aim of this thesis is to explore architectural education more broadly as a means of developing the climate-responsible knowledge and skills needed for sustainable development. As such, architectural education is viewed differently through a system of learning as an organisational framework. The elements of the systems of learning were identified in Chapter 3 as the multiple contexts of learning, the people involved and their roles, and the actions, interactions and change. These elements are defined for the selected architectural education programs using the methods of documentation discussed in this chapter. While the contexts of learning and the people are more easily defined, understanding the interactions that take place
requires additional measures. The identification of the epistemological positioning of the programs enables an understanding of how knowledge is likely to be developed. The skills and abilities that are expected of students as they progress through the program reflect the types of communication and the nature of the interactions that are supported within the programs. The different ways in which the process and outcomes of learning are made visible highlights opportunities for reflection and critical review.

The multiple methods of mapping and diagramming are used in this thesis to document each element of the system of learning. The multiple contexts of the system are mapped and hierarchies are identified. The interaction within the system is measured using evidence of curriculum and pedagogical practices. The types and roles of people are defined using enrolment figures and allocation of staff to teaching activities. The epistemological positioning of each of the selected architectural education programs is ascertained through an exploration of the programs’ types of learning activities. The entry requirements and processes are used to identify assumed skills and abilities. The ways in which the learning process is made visible within the programs is documented. These methods are used as an alternative way of assessing and evaluating the architectural education programs.

It is not the intent of this thesis to identify trends and patterns, or to determine casual relationships between architectural education, learning experiences and transformation. Rather, the aim is to identify the characteristics of architectural learning; to determine how the core skills of critical reflection, communication and collaboration can be developed; and to account for the different situations, events and activities in which transformative learning can take place. Traditional methods of ranking and architectural education programs have been unable to offer any insights in this regard due to the narrow scope of their assessment. However, the documentation of the selected architectural education programs in Appendix C is unable to capture transformation that may occur over time, or the way in which a shift in worldview influences and changes behaviour, as the survey used information available at the time, and was not conducted over an extended time-frame.

4.2 The Documentation of Transformative Experiences

This thesis seeks to identify that change has occurred, and to recognise the ways in which this change has been made possible, not to measure the extent of change or

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14 These methods of documentation and the modes of analysis are described in detail in Appendix B.1. The documentation created surveying the information made available online by the selected architectural education programs, the maps and diagrams, is presented in Appendix C.1. The findings of this survey are presented in Appendix C.2.
transformation as such. While it is the extent of change or transformation that is often discussed within the architectural and educational literature reviewed (Appendix A.3), the nature of the change remains centred on students, the educational and built contexts and the education systems itself. The process described in this chapter measures architectural education in a different way to understand the complexities of the system in which this education takes place. This process has been applied to selected case studies of architectural learning in order to capture the experiences that are typically difficult to identify, namely the development of the core skills of critical reflection, communication and collaboration.

The additional documentation methods used in this thesis document the transformative learning experiences that occur within the system through mapping, interviews and observation. In this way, it is easier to recognise the way in which transformation is prompted, supported and sustained and the changes that occur over time. The evidence collected using these methods informs an understanding of the way in which the contexts influence the learning that takes place, the nature of interaction between individuals, and the relationship between the contexts. This evidence is analysed to determine the characteristics of learning experiences, research may focus on the relationship between two contexts (e.g., the role of the built environment in education) (Taggart 2002), a specific event or learning activity (e.g., the design studio) (Armstrong 1999), or a particular component of the educational context (e.g., technology) (Bruton 2003). The use of a case study approach within this thesis accounted for systems of learning, provided evidence of situations and phenomena in multiple contexts, and documented the actions of the three social groups (i.e., teachers, students and community) within the contexts of the learning.

The disturbing dilemma critical to transformative learning (e.g., unexpected, uncomfortable or unfamiliar experiences), were not easily documented (i.e., mapped and diagrammed) when examining the architectural education programs. Such experiences occur over long periods, as the learner seeks the new knowledge or to develop the skills that they have found to be missing. The subsequent catalytic experience occurs over time as new skills are practiced and unexpected experiences are repeated. The resultant transformation requires ongoing support from the multiple contexts that are shared by those involved in the experiences. The documentation methods used in this study enabled an understanding of these experiences that take place within the transformative learning system, the contexts that are used, the nature of the different interactions that take place, and the diversity of the relationships that support the transformation. However, in a dynamic learning system, situations change and experiences differ, often prompted by interaction within the system.
As the primary focus of this research is to understand how architectural learning can prompt, support and sustain sustainable behaviour, it is important to extend the collection of evidence of learning experiences beyond the single ‘snapshot’ or moment. In this study, the process of evidence documentation is extended by being in place, and the interactions and the change are recorded alongside the milestones and the outcomes. The researcher was immersed in the learning system when visiting the three case studies of architectural learning that have been identified here as transformative. As such, the evidence collected and understanding acquired while observing and recording the learning experiences was comprehensive across the multiple contexts of the system of learning, capturing the experiences of students, staff and communities. The methods of analysis applied to the evidence collected were structured around three modes—reflective analysis, narrative analysis, and acquired immersion (see Table 2).

<table>
<thead>
<tr>
<th>Element of System</th>
<th>Method of Documentation</th>
<th>Mode of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contexts</td>
<td>Mapping</td>
<td>Reflective Analysis</td>
</tr>
<tr>
<td>People</td>
<td>Interviews</td>
<td>Narrative Analysis</td>
</tr>
<tr>
<td>Interactions</td>
<td>Observation</td>
<td>Acquired Immersion</td>
</tr>
</tbody>
</table>

Source: author’s own (2015)

The methods used to document the contexts, captured the experiences of different people involved and recorded the diverse interactions that take place. The roles of those participating within the learning experience were identified by documenting immediate experiences, as well as those that had taken place over the long-term. This approach conveyed a sense of the complexity of the situations in which learning can occur, and captured a greater extent of the learning system. The learning activities were recorded by attending and observing selected classes within the chosen program, but not participating. These classes were selected to record actions and situations related to the subject focus, the cohort involved, or the staff members coordinating the events. Documentation of the contexts in which these programs occur, primarily those evident in the surrounding built environment, accounted for the complexities of the experiences that took place at different scales and with differing foci. Series of sequential photographs were taken to document the context of a journey, complementing the documentation events and activities. The places visited included the learning spaces, as well as the surrounding suburbs and/or towns.
The language (verbal and non-verbal) of those involved was captured in interviews with members of the senior leadership team of each organisation and the directors, coordinators or instructors of the programs. The resultant narratives have provided insight into staffs’ educational background; and the situations that led to their involvement in the architectural education program, the broader institutional context, and the context of organisation change. This provided insight into individuals’ capacity for change within the system or institution.

In this research, the evidence documentation of the case studies of architectural learning comprises descriptions of the contexts in which learning experiences occur, the people involved and their actions. These accounts are used as a means of understanding experiences and identifying the events and situations that support transformation, including catalytic experiences, opportunities to reflect and the formation of relationships with others. Learning experiences are accounted for using the methods of documentation to describe the system of architectural learning. Typically, such accounts in qualitative research are ‘pieces of talk’ offered to explaining self to another person (Tracy 2004), as it is through talk that people understand each other. However, as this thesis is addressing interactions within a system and between the contexts, the accounts must also describe these contexts and the actions that take place within and between them. Therefore the documentation of the case studies in Appendix D.2 use multiple languages to account for the experiences. The contexts are described visually and graphically through charts and photographs. Written descriptions of the actions of those participating within these contexts are supplemented by visual evidence. Interviews with selected people contain verbal descriptions of learning experiences both within the selected contexts and prior to their current experiences.

4.3 Understanding the Learning Experiences

As noted in Chapter 3, the framework of the system of learning is used to understand the complex and dynamic architectural learning experiences. Changes in the contexts and the transformation of the individuals within the case studies of architectural learning are made visible using the multiple methods of mapping, interviews and observation. These documentation methods allow for multiple accounts of the same or similar events and situations. The analysis of these accounts provides insight into the ways in which this transformation is prompted, supported and sustained through learning. Reflective analysis is used to define the different contexts of architectural education that have been mapped and photographed. The worldviews of individuals are explored using narrative analysis of the
interviews that were conducted with the senior leadership teams of each program. Acquired immersion enables observations of interactions and learning activities of each of the case studies of architectural learning. The records of these observations, photographs, field notes, audio recordings and journals have been analysed to determine how and where the core skills of critical reflection, communication and collaboration are developed within the case studies of architectural learning. The analysis of the evidence collected is detailed in Appendix B.

A coding framework has been developed here to organise the evidence collected and determine how and where transformation is prompted, supported and sustained. Abductive reasoning has been used in this thesis, as this process aligns with one of the core aims of this thesis to identify experiences that support transformative learning, rather than to outline a precise model of architectural education. As noted by Blaikie (2004a), this form of reasoning seeks ‘to discover why people do what they do by uncovering largely tacit, mutual knowledge and symbolic meanings, motives and rules that provide orientations for their actions’.

Occurrences within the social world are initially derived from the accounts given by actors within those worlds. The accounts given by actors are supplemented by other accounts, or descriptions, of the social world. Subsequently, categories and concepts are derived from these accounts to form an understanding of the meaning made through experience. As one of the aims of this thesis is to identify how learning can support sustainable behaviour, uncovering the motivations for behaviour is achieved through such a reasoning process.

The four contexts identified in the system—built, natural, social and educational—are defined in relation to architectural education and climate-responsible design. The different characteristics of these contexts found in the detailed mapping of these contexts are listed in Table B.4. Thematic analysis of the interviews identified the characteristics of the people involved in the program (Table B.6). The characteristics of the types of interactions that took place between individuals and across contexts, are listed in Table B.7.

The coding framework in Table 3 has been used to organise and guide this analysis. Evidence of where the core skills of communication, collaboration and critical thinking are

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15 Blaikie (2004a, 2) defined mutual knowledge as ‘background knowledge that is largely unarticulated, constantly used and modified by social actors as they interact with each other, and produced and reproduced by them in the course of their lives together. It is the everyday beliefs and practices—the mundane and taken for granted—that have to be grasped and articulated by the social researcher to provide an understanding of these actions’. In the context of this study, mutual knowledge refers to the knowledge, skills and capabilities that are taken for granted within architectural learning (i.e., the core skills).

16 The findings of this analysis are discussed further in Chapter 5. Similarities and differences between the case studies are identified. Mostly descriptive, these findings rely on the interpretation and analysis of documentation and mapping.
developed, either explicitly or implicitly, is sought to determine how and for whom transformation occurs. This is discussed further in Chapter 6.

Table 3: The Coding Framework of Transformative Experiences in Architectural Learning

<table>
<thead>
<tr>
<th>Contexts</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built - demonstrating</td>
<td>Active elements—providing efficient performance</td>
</tr>
<tr>
<td>responsible design</td>
<td>Passive elements—operative—encouraging interaction</td>
</tr>
<tr>
<td>Natural—connecting with</td>
<td>Moderated environments—replacing lost environments</td>
</tr>
<tr>
<td>nature</td>
<td>Unmoderated environments—conserving native environments</td>
</tr>
<tr>
<td>Social—supporting</td>
<td>Passive elements—fixed—climate responsive design</td>
</tr>
<tr>
<td>interaction</td>
<td>Social groups—providing spaces for people to come together</td>
</tr>
<tr>
<td>Educational—visible learning</td>
<td>Learning by doing—experiential learning</td>
</tr>
<tr>
<td>Scale of social groups</td>
<td>Learning experiences—how, who and where</td>
</tr>
<tr>
<td>Small</td>
<td>Being in place—knowing the world</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td></td>
</tr>
<tr>
<td>Complexity of social groups</td>
<td>Interconnected</td>
</tr>
<tr>
<td>Small</td>
<td>Intraconnected (like-minded)</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td></td>
</tr>
<tr>
<td>Benefit of learning</td>
<td>Direct/individual</td>
</tr>
<tr>
<td>Small</td>
<td>Reciprocated</td>
</tr>
<tr>
<td>Medium</td>
<td>Shared</td>
</tr>
<tr>
<td>Large</td>
<td></td>
</tr>
<tr>
<td>Teaching Practice</td>
<td>Pedagogical—teaching focused</td>
</tr>
<tr>
<td>Andragogical—student centred</td>
<td>Critical—adaptive and responsive</td>
</tr>
<tr>
<td>Learning Experiences</td>
<td>Roles of individuals—novice/expert</td>
</tr>
<tr>
<td>Cognitive process—levels of</td>
<td></td>
</tr>
<tr>
<td>Thinking</td>
<td>Modes of learning</td>
</tr>
<tr>
<td>Modes of Interaction</td>
<td>Passive vs active—those watching and those doing</td>
</tr>
<tr>
<td>Understanding via real or</td>
<td></td>
</tr>
<tr>
<td>virtual experiences</td>
<td>Between or within social groups</td>
</tr>
</tbody>
</table>

Source: author’s own (2015)

The framework of the system of learning has been used in the first instance to organise the elements of the system (i.e., the contexts, people and interactions) and then selectively to code the documentation created. This coding framework is used to make sense of the documentation, find meaning in the maps, interviews and observations, and define the relationships between the elements. Prior to analysis, evidence was reviewed to identify photos, maps and interviews irrelevant to the transformation. The artefacts were organised.
and labelled; the evidence was categorised according to the nature of the learning experience and those involved. Where the situation documented was not clearly connected to the learning experience, or not directly associated with a defined activity, outcome or situation, the evidence was placed to one side. For example, the evidence collected at the College of Architecture, Design and Construction at Auburn University’s main campus, while interesting, did not offer additional insights about the Rural Studio program. Similarly, the documentation at the Kelburn Campus of the Victoria University of Wellington provided no additional information about the activities of the architecture program on the Te-Aro campus.

Once the evidence had been sorted, unexpected or unusual occurrences, behaviours and phrases within the evidence were identified as possible disturbing dilemmas or catalytic experiences. Common occurrences within the evidence (including those across different contexts or with the same individuals, and patterns in behaviour that were related to the context or unusual one-off occurrences) were collated to determine the nature of the relationship between the categories. The coding framework allowed for the categories of each of the learning system elements to be identified and criteria for recognition to be defined. A more detailed description of this coding process is presented in Appendix B.2.

The categories and characteristics of transformative experiences in architectural learning that have been derived from the analysis of the evidence collected form an understanding of the nature of learning experiences in architectural education, the meaning that is made within learning experiences, and how this meaning influences behaviour. The coding framework defines the characteristics of the learning experiences that can lead to a shift in worldview—the primary measure of transformation. The coding across the different methods of evidence collected ensures that the interpretation of the various forms of documentation created is consistent across all forms. Comparison of the changes that are found in the case studies to the examples of current practice is used to identify areas of similarity, and areas in which there are clear differences.

4.4 Validity of Research Methodology

The methods discussed in this chapter are different to those typically used to account for architectural education (e.g. global rankings and accreditation procedures). Case studies have been used in this research to build the emergent theory through an iterative process of data collection, analysis and theory generation (Eisenhardt 2002). This process has enabled a creative approach to theory development: simultaneous data analyses and data collection, while in the field, allowed for the alteration or addition of data collection instruments in
response to situations as they emerged. Such fine-tuning of data collection methods during the study is appropriate for qualitative research using case studies (Eisenhardt 2002). Eisenhardt (2002) noted that the nature of fieldwork means that unforeseen events may give rise to new data collection opportunities; data analyses conducted during the case study may provide new theoretical insights, prompting further data collection. As the intent of the selected case studies in this thesis was to understand the learning experiences within unique settings, data collection methods were adjusted to accurately document the contexts. For example, the techniques of photo sequences and panoramas were first employed while visiting the University of South Australia (Figure 4a), and were repeated for the subsequent case studies (Figure 4b) and (Figure 4c).

(a) Mawson Lakes, Adelaide, South Australia

(b) Third-year ‘yard work’ at Rural Studio

(c) Formal Learning Space, Victoria University of Wellington

Figure 4: Panoramas depicting the broader built context


Observer bias in qualitative research—particularly in observational research—must be given careful consideration, including awareness of observer reactivity and the extent to which the observation affects the setting. As noted by McKechnie (2008, 731), reactivity is generally unavoidable in this type of research. Therefore, it is the role of the analysis to ‘uncover and respond’ to reactivity in certain ways through dynamic data collection and researcher reflexivity. In the case studies documented in this thesis, while every attempt to be non-intrusive was made, no attempt was made to be covert. The researcher had little participation
in the learning activities, although taking photos and recording field notes attracted attention. However, as the researcher stayed for 2 weeks at both Rural Studio and Victoria University of Wellington, the impact of the intrusion was mitigated.

To address the potential reactivity, and to understand the extent to which this influenced the observations, informal discussions were held with some of the staff about the nature of the research and their thoughts on their learning experiences. These discussions were recognised as important and appropriate by both the researcher and the staff. At Rural Studio, the architectural education program is often the subject of scrutiny and as such, there have been many visitors to the Rural Studio farm. However, many of these visitors are interested in the completed projects and the social philanthropic nature of the program and therefore the reasons for their visits and observation are different. These visits are often fleeting. At Victoria University of Wellington, the Firstlight Project has also been well-publicised and those involved directly in it seemed comfortable discussing the project. However, observing the classes and learning activities of the program was unexpected. Discussions with students indicated that they misunderstood the reasons for the observations: some thought that the staff were under assessment. These discussions allowed for the nature of the research to be explained. As such, the intent of the observations to objectively document experience, not critically assess performance or outcomes, was made clear. During these conversations some additional insights were gained about the experiences.

In addition to the field notes and observations, reflexive journals were also used to record the researcher’s personal reflections of the experiences. Before and after fieldwork, the researcher recorded their mindset and other things that could act as variables which could influence the recording and interpretation of the evidence. The key variables included: the newness of the methods of evidence collection, and the necessary and ongoing development of skills of observation while in the field; and the unfamiliarity of the physical and social context of the research. Development of concepts and theory were also recorded as new evidence came to light through the experiences.

In addition to the consideration of the validity of data collection methods discussed previously, the validity of the accounts of the phenomena or situations themselves can also be a concern in qualitative research. Maxwell (2002, 39) recognised that how researchers gain an understanding of the object of their research can directly influence how concerns of validity of are addressed. To address concerns about descriptive validity, I have used methods of documenting the case studies that were objective, employing modes of communication that were clearly understood by others. Additionally, the use of multiple methods of data collection in this research—mapping, photographs, interviews, and observation—provided evidence of
phenomena or situations in multiple ways. The interrelationships between the data and the analyses for similarities and differences between data, further confirmed the validity of the accounts documented.

The ways that the meaning of the evidence is interpreted can bring to the fore the question of interpretive validity. The methods of interpretation used should ensure that the meaning reflects the participants involved, not the researcher. At Rural Studio, exhibiting my thoughts to explain and justify them to those whom I had been observing was a fruitful exercise. Mapping people, place, and projects over time in the field, in different ways, allowed me to present back to Rural Studio a portrait of themselves (i.e., a picture of how others viewed them). Interestingly this study’s characterisation of Rural Studio differed from previous characterisation, wherein observers have focused on the projects that their design-build program created: this study’s portrait focused on the learning experiences. This coincided with an especially reflective period at Rural Studio, as they were preparing for their 20th anniversary in 2013.

These methods of capturing experience—mapping, recording (aural and visual), interviewing, and observation—were supplemented by personal journaling. Thoughts, ideas, insights were recorded daily—often more than once per day—as the need and opportunity arose. Writing became a way of exploring ideas, interpreting my personal experiences, processing and making sense of my own learning. In doing so, it became clear that this process of knowing and understanding current contexts, experiences and interactions is a critical component of a transformative learning experience. Therefore, the documentation collected and its analysis led to insights about my own transformative learning experiences. Identifying the key elements that support transformative learning and developing ways of recognising change through the process of evidence collection became a necessary part of this process of knowing. This process resulted in the development of my knowing and understanding of self and heightened my skills in recognising values and beliefs. This enabled me to make the values and beliefs of others explicit, and identify how these beliefs could be challenged and changed.

The research and evidence collected at Rural Studio was exhibited informally at Rural Studio at the conclusion of the visit (see Figure 5 and Figure 6) and formally as part of the Go Away Come Back Exhibition (Mackintosh 2013) illustrated in Figure 7. Exhibiting this work required reinterpretation of the experience and reflection on what had been collected. It was an opportunity to explore methods for sharing experiences.
At Rural Studio the evidence collected in the preceding 2 weeks was curated to present a summary of the learning experiences observed and to elicit responses from those viewing the works. A timeline mapping the many places that Rural Studio has worked in, the people who have been involved and the projects that were built was presented (top, Figure 5).
Viewers were asked to place themselves on this timeline using post-it-notes. The journey from the farm to the studio was presented as a series of sequential photographs (middle, Figure 5 and centre left, Figure 6), to increase awareness of an everyday experience. Viewers were asked to highlight their name on the lists of people involved in each of the Rural Studio projects over its 20 year history (lower left, Figure 5). A summary of the research findings to date was offered (far right, Figure 6), with common themes traced through the different components of the findings. The viewers were also invited to write their own message on paper cut-outs in the shape of t-shirts (far left, Figure 6), and were prompted to complete the sentence ‘I am ...’. 

The *Go Away Come Back* Exhibition provided an immersive visual and audio experience, in which a 360 degree panorama of the Rural Studios projects at Lion Park, Greensboro was displayed at eye height. Viewers were invited to step inside the installation and listen to a sound recording made at the place displayed. The insights gained from reflecting on these exhibitions, and the methods used, has strengthened my own practices in architectural learning.

![Figure 7: Installation of Coming Away With ..., Go Away Come Back Exhibition, 2013](image)

The review of articles published within the field of architectural education, discussed further in Appendix A.3, has indicated that discussions seldom address learning as an experience or consider the influences of multiple contexts. The contexts are often discussed discretely and the relationships scrutinised are those within single contexts. The global rankings and accreditation procedures discussed in Chapter 3, and the survey of information made available online by the relevant architectural education programs reflects this. These ranking and survey methods focuses on the outcomes of staff and students and do not address the processes and experiences required for transformative learning.
The methods discussed in this chapter, and described in detail in Appendix B.2, adopted a more cohesive and comprehensive approach. This approach is supported by the organisational framework of the system of learning in which the multiple contexts of learning and the diverse abilities of those participating in architectural education programs are made explicit. This has enabled insights about learning experiences that recognise the complexities of these experiences and the dynamic nature of learning. The different methods of recording learning experiences, documented in this thesis, have enabled the nature of learning experiences to be examined in a new way. As such, this thesis explores how real-world experiences of learning can be shared and understood in different ways. The contexts of learning are mapped through purposeful and critical reflection of the situations. The identification of the characteristics of the contexts brings to the fore the way in which these contexts can relate to each other. The method of modelling worldviews, through an examination of how learning experiences are shared, is a means for understanding the relationships between people and the interactions that occur, and can prompt a shift in epistemological position and worldview. The roles of the people involved and modes of interaction within an architectural learning process can be identified through the observations of their behaviours. These observations make the cognitive processes and modes of learning explicit. In doing so, change in the contexts, the people and the interactions within systems of architectural learning can be captured.

The next chapter discusses the findings from the documentation created during the visits to the selected case studies of architectural learning at the University of South Australia, Auburn University, and Victoria University of Wellington. The coding framework of transformative experience is used to identify the nature of the learning experiences in which the core skills of critical thinking, communication, and collaboration are developed explicitly.
CHAPTER 5: CASE STUDIES: LOOKING AT PROGRAMS OF ARCHITECTURE

This chapter discusses how critical thinking, communication and collaboration are developed by an architectural student within the complex process of architectural education. These core skills, which enable a designer to come to an environmental and cultural understanding, can also prompt transformation in the contexts, people and interactions of the learning system. The development of these core, non-technical skills can be difficult to recognise using traditional methods, such as global ranking systems and the accreditation procedures. In Chapter 4 the methods of documenting a system of architectural learning is explained to demonstrate how the contexts of the architectural education programs, the abilities of the people engaged, the epistemological positioning of the program, and the learning processes that take place were captured. These methods, described in detail in Appendix B.1, were used to document selected architectural education programs at Massachusetts Institute of Technology, University College London, Delft University of Technology, University of California, Harvard University and Southern California Institute of Architecture. Analysis of this documentation has determined how these core skills are developed in architectural education.

To further explore how these learning experiences contribute to transformation, selected case studies of architectural learning at University of South Australia, Auburn University, and Victoria University of Wellington were documented using the additional methods described in detail in Appendix B.2. The multiple contexts of learning were mapped in finer detail. Narratives recorded during meetings with the people involved provided insights regarding the role of staff, students and communities. The activities conducted as part of the architectural learning were observed and the interactions and behaviours that occurred were photographed to account for the relationships and connections between those engaged in these activities, both directly and indirectly. The evidence was organised using the coding framework of transformative experiences to identify the characteristics of learning environments in which the development of core skills was supported.

5.1 Examples of Current Practice in Architectural Education

In Chapter 3, the role of current ranking and accreditation processes were discussed as a means of examining programs of architectural education. However, these systems and processes do not address the way in which the core skills of critical reflection, communication and collaboration are learned, and the experiences in which they are developed. The
alternative methods discussed in Chapter 5, and explained in Appendix B, have been applied to six programs selected as examples of current practice in architecture education (listed in Table 4). These programs were selected as examples of current practice in architectural education, based on the ranking systems for architectural education programs. In 2014, when this study was conducted, the top five programs in architecture, as ranked by QS TopUniversities, were those offered at Massachusetts Institute of Technology (MIT); University College London (UCL); Delft University of Technology (TU Delft); Berkeley University of California, Los Angeles (UCLA); and Harvard University. Since 2014, the rankings have continued to indicate that these same programs remain the top five. The architectural education program at the Southern California Institute of Architecture (SCI-Arc) was the highest ranked program by Graduate Architecture in 2012. It is noted that all six programs are accredited by their national bodies, and the three countries represented— the United States of America (USA), Netherlands and the United Kingdom (UK)—are members of the International Union of Architects (UIA). As such, there is similarity and consistency in the structure and content of these programs, as accreditation procedures and UIA membership ensures that the objectives of architectural education are generally aligned (UIA Education Commission 2011). However, this analysis seeks to better understand the learning experience in these architectural education programs and examines evidence beyond that used for global ranking and accreditation.

Table 4: Selected Examples of Current Practice in Architectural Education

<table>
<thead>
<tr>
<th>Faculty/School</th>
<th>University</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Architecture &amp; Planning</td>
<td>Massachusetts Institute of Technology</td>
<td>Cambridge, Massachusetts USA</td>
</tr>
<tr>
<td>Bartlett School of Architecture</td>
<td>University College London</td>
<td>London, UK</td>
</tr>
<tr>
<td>Department of Architecture</td>
<td>Delft University of Technology</td>
<td>Delft, Netherlands</td>
</tr>
<tr>
<td>Department of Architecture</td>
<td>University of California</td>
<td>Berkeley California, USA</td>
</tr>
<tr>
<td>Graduate School of Design</td>
<td>Harvard University</td>
<td>Cambridge, Massachusetts USA</td>
</tr>
<tr>
<td>Southern California Institute of Architecture (SCI-Arc)</td>
<td>Los Angeles, California, USA</td>
<td></td>
</tr>
</tbody>
</table>

Source: TopUniversities (2014) and Graduate Architecture (2012)

The survey of information made available online by these architectural education programs provided has documented the epistemological position, the expected abilities of students, and the elements of the learning system—the contexts, the people and the interactions. Analysis of these selected architectural education programs indicates that there is a consistency in contexts and the role of the people involved in the programs. This reflects a global system of architectural learning that does not recognise the differences of location nor
contextualise the learning. However, some programs differ in noticeable ways when the additional methods of mapping are used to document the interactions that occur within programs, the world view reflected in the learning activities, the assumed skills and abilities of students, and the learning processes visible in the program. The program at UCLA seems to be the most distinctive in terms of interaction and staffing (see Appendix C., Figure 56). Almost equal focus is given to design, culture and electives in the undergraduate program and there are more full-time members of staff than part-time. The trend in other programs is the opposite. For example, the undergraduate program at SCI-Arc has the most evenly distributed curriculum across all subject areas (see Appendix C., Figure 70). The postgraduate program at SCI-Arc has allocated the smallest percentage of the curriculum to the design subject area, one of the highest percentages to research and provides the greatest opportunity for electives. As such, students in the SCI-Arc program have the greatest choice and the capacity to direct their learning. The program at Sci-ARC also has the highest staff–student ratio (see Appendix C., Figure 69), and is located on the most urbanised campus (see Appendix C., Figure 68), with 92 per cent of the surrounding area documented as mixed use. The different learning activities (see Appendix C., Figure 71) within the program at SCI-Arc suggest that the world views and epistemological positions are likely to be diverse.

The program at The Bartlett School of Architecture has the greatest focus on the design subject areas in both programs (see Appendix C., Figure 42). As a result, in the undergraduate program, electives and research are not well-represented. It is assumed that some of the content of the research subject area is embedded within the design units, supported by the strong horizontal integration evident in the program. In the postgraduate course, environmental, professional, visual studies and electives are not represented. This reflects the expectation that the prerequisite bachelor programs provide the necessary skill and ability development for students to do well in the master’s programs.

Summaries of each of these programs are provided in Appendix C.1 along with additional details, maps and diagrams. The findings that have emerged from comparative analysis of this documentation are used in this chapter to illustrate how core skills are developed in architectural education programs.

The examination of current practice has identified that, to some extent, the architectural education programs are providing the learning experiences that have been called for by theorists discussed in Chapters 1 and 2. The intense nature of the social context—when living, working and learning occur in close proximity—reinforces social connections and fosters collaboration among staff, students, and the professional community. The involvement of practitioners as educators also grounds the learning in real-world practice and supports
students’ understanding of others and effective communication skills. However, despite the change in the learning, there seems to be little change in the profession. The practice of architecture remains disconnected from practical everyday life, and the hidden curriculum that Dutton (1991, 165-94) identified as reinforcing ideologies, values and assumptions is strengthened by the involvement of elite professionals in teaching.

Accreditation procedures expect that masters students have appropriate levels of academic (i.e., research) and spatial (i.e., design) abilities, and be visually literate and numerate (Architects Accreditation Council of Australia and Australian Institute of Architects 2013). However, these skills and abilities are not explicitly supported in undergraduate programs and are expected to be learned implicitly. Ostwald and Williams (2008) wrote in their study of Australasian architecture schools that during the years 1994–2006, there was a shift from the even distribution of study areas taught in undergraduate and postgraduate programs, to study areas being exclusively taught in one of the two programs (Ostwald and Williams 2008, 129). For example, by 2006, communication skills were exclusively taught in bachelor programs, while professional practice was almost exclusively taught in the masters programs. The trend was also evident in the architectural education programs studied in this thesis. Typically, in the undergraduate programs, visual studies (wherein students develop visual communication skills), accounted for 4–11 per cent of the curriculum. In only three of the six architectural education programs studied, these skills were developed further in the postgraduate program. Similarly, the research subject area represented 3–11 per cent of the curriculum in five of the undergraduate programs. In the corresponding postgraduate programs, these skills continued to develop, with 10–15 per cent of the curriculum focused on this area(Ostwald and Williams 2008, 129-33).

This imbalance is also observed in the technical and environmental subject areas. The technical areas accounts for 11–17 per cent of the undergraduate curricula, and 9–13 per cent of the postgraduate programs. The environmental subject areas account for 3–6 per cent in both undergraduate and postgraduate programs. The exception to this was Harvard University wherein 20 per cent of the postgraduate curriculum was focused on environmental areas, although no allocation was given to technical areas. In this case, it was assumed that the necessary content, knowledge and skill development for technical studies was contained with the undergraduate program only (Harvard University 2015).

The evidence has shown that the skills required by the professional are not necessarily the same skills that are required as part of entry into the postgraduate courses. For example, the skills required in the professions include social abilities (e.g., leadership and collaboration skills), practical abilities (e.g., the ability to apply knowledge to varying situations within the
real world), emotional abilities (e.g., empathy and understanding of others), communication skills (e.g., clear articulation of ideas and concepts and spoken language abilities), and environmental literacy (e.g., understanding of context, site and environment) (Architects Accreditation Council of Australia and Australian Institute of Architects 2013). The structure of the architectural education programs and the nature of assessment typically reinforce the pursuit of individual skills over collaborative skills, due to difficulties in assessing group work (Ostwald and Williams 2008). This emphasis on individual achievement is demonstrated not only in tertiary architectural education programs, but also in the professional registration process itself. Therefore, it is assumed that the skills required for workplace collaboration are implicit within the architectural education program, or are considered assumed knowledge that a student has gained prior to entry into the program.

The long-standing concern that the architecture profession is disconnected from practical life (Llewellyn-Davies 1960, 709) remains and requires improvements in designers’ communication, collaboration and critical thinking skills. The organisational structure in which current architectural education programs are situated reinforces this concern, with their emphasis on design-focused disciplines. While some architectural education programs are discrete organisations within their institution, other programs are a part of departments or schools of architecture; often there are many departments or schools within a larger faculty. Typically, these schools of architecture are aligned with the disciplines of planning, development, construction and landscape. The architectural education programs are typically located within schools or faculties of built environment and design rather than engineering.

Within the organisational structures documented, students are more likely to learn how to improve current practices of architecture rather than generate completely new ways to practice architecture or fundamentally question their thinking about architecture. Some elements of the architectural education programs surveyed, such as design–build and community-focused projects, may shift the focus of students to a more social-oriented approach. However, the familiar environments (e.g., when the build takes place on or near campus) and like-mindedness of those involved (due to the programs’ entry requirements) are likely to result in the reinforcement and strengthening of existing discipline-specific skills. As there is often limited access to cross-curricular experiences that present alternative points of view to those presented in architectural education programs, it is less likely that students will be prompted to challenge what is being taught.

Within the selected architectural education programs, the development of environmental understanding is problematic, as the natural environment is not clearly evident in the contexts in which the learning occurs. The natural context is primarily moderated when
it is present; additionally students’ experiences of the natural environment rely on shared vicarious experiences, or scientific and technical knowledge, rather than personal and direct experience. It is unclear if and how this knowledge of a known-of world is transferred to the known world and self-world, given the absence of a natural context, or it’s limited representation in the curriculum.

Through their perception of the world, students come to understand themselves in (Dutton 1987, 25). This perception, or worldview, is influenced by meaningful communication and collaboration with diverse people in different situations. This thesis argues that despite the different methods used in documenting architectural education, it is difficult to recognise how this worldview is developed. While the development of the environmental and cultural knowledge required to support and sustain the practice of climate-responsible design can be found and documented in the selected architectural education programs, it is not clear how or where these core skills of critical reflection, communication and collaboration are explicitly taught. Additional examples of architectural education programs are needed to explore the development of these skills further.

Atkin (1999, 14) examined how learning can be transformative ‘in a way which endows our experience with meaning; in a way which empowers us to perceive differently, to value and appreciate differently; to adapt and create’. Atkin (1999) used her own experiences to explain how knowing of something can often be the catalyst for transformation, in which understanding of the known-of world is shifted to the known. The known-of world is important as it serves to direct and focus attention, and assists with decision-making. The more we know of a topic or subject area, the more likely we are to want to experience it personally, and vice versa. It is often personal and direct experiences that prompt further enquiry and investigation, to seek what others know of the world. Experiencing a topic through making, doing, and by being, increases the relevance of the topic to the self, which can ultimately prompt a change or shift in individuals’ self-world of thoughts and values. As these additional programs provide learning experiences that have transformed the practices of those involved; this thesis’s documentation of these experiences seeks to explore how this transformation has come about.

5.2 Case Studies of Architectural Learning

Three case studies of architectural learning at the University of South Australia, Auburn University, and Victoria University of Wellington have been selected for the potentially transformative learning experiences. They are discussed here as a means of identifying for the
learning experiences that prompt, support and sustain change. Each case study focuses on architectural learning differently. The University of South Australia focuses on the effect of sustainable development on new suburbs in Adelaide. The impact of the architecture program and building performance research at Victoria University of Wellington can be observed in local architectural practice. The projects completed by Rural Studio students benefit local communities beyond the projects themselves. While each of the programs differs in their focus, there are similarities. All programs influence their broader context and have been the catalyst for long-term change. This influence is due in part, to the design-build approach of the three case studies. It is acknowledged that design-build programs are not the only examples of transformative learning experiences. However, the learning experiences within such programs differ from traditional education activities, and the changes made, especially to the built environment, as more easily identifiable. Therefore these programs are examined here in order to identify, and create, other approach to transformative learning.

Table 5: Selected Case Studies of Architectural Learning.

<table>
<thead>
<tr>
<th>Faculty / School</th>
<th>University</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Architecture and Design</td>
<td>University of South Australia</td>
<td>Adelaide, South Australia, Australia</td>
</tr>
<tr>
<td>College of Architecture, Design &amp; Construction</td>
<td>Auburn University</td>
<td>Auburn, Alabama, USA</td>
</tr>
<tr>
<td>School of Art and Design</td>
<td>Victoria University of Wellington</td>
<td>Wellington, New Zealand</td>
</tr>
</tbody>
</table>

Source: author’s own (2011).

Summaries of the programs and samples of the documentation created for each case study are presented in Appendix D.

The documentation of these case studies created using the initial mapping methods (presented in Appendix C.1.7-9) indicated that there is very little difference in the structure and overall curriculum to the selected architectural education programs. This is not unexpected because the programs are guided and influenced by shared global ranking and accreditation procedures. The curricula are consistently focused on design, though the emphasis on the other core subject areas differs.

From the survey of information made available online by the relevant architectural education programs, it is not clear how the nature of the learning experiences presented in the architectural education programs has resulted in the development of core skills and transformation of worldview. Additional documentation is needed to better understand this process. The methods of mapping, narratives and observations were used to determine whether the development of the core skills of critical thinking, communication and
collaboration have been explicitly taught in these programs, or whether these skills are assumed to be developed prior to commencing and are presented implicitly in formal activities.

Skills in critical self-reflection are develop by providing the opportunity to reflect during and after the learning experience, can prompt the challenging of assumptions and questioning of belief that catalyses a shift in inner worldview. This was observed in two of the three case studies (Case Study 2: Rural Studio and Case Study 3: Victoria University of Wellington) wherein opportunities repeatedly brought to the fore changes in context, people and interaction.

Figure 8 illustrates the different physical and educational contexts, in which learning takes place, while the student undertakes different tasks. The interactions that were observed throughout the various learning activities made the learning visible. As such, exposing the learning progress and making the learning visible prompts critical reflection through comparison.

![Figure 8: Different Contexts and Different Tasks, Rural Studio](image)

Student as Maker (left), Listener (middle) and Documenter (right).

Photographs: author’s own (2012).

By providing experiences in which students can adopt different roles, such as learner (left and middle, Figure 9) and teacher (right, Figure 9) the learning progress is made explicit. Peer teaching and review requires critical self-reflection; this is because effective teaching and communication are underpinned by high levels of self-awareness and understanding.
At the University of South Australia City West Campus (see Figure 10), passive elements (e.g., sun shading on the north façade of the Barbara Hanrahan Building) and active elements (e.g., chilled beams in the classrooms in the Kaurna Building) within the built environment can also prompt reflection. Awareness of contexts is needed to recognise what is occurring in the environments. The impact of the design on comfort can prompt a questioning of the success of the design strategies. Such built environments are also useful demonstrations of design.

Critical self-reflection was evident at Rural Studio, wherein students conducted peer review sessions (see Figure 11) independent of the formal reviews held in class (see Figure 12).
The benefit to both self and others was visible, as students receive and gave feedback to each other, and staff made the critical reflection explicit in the formal review process.

![Figure 11: Third-Year Informal Peer Review Session, Rural Studio](image)

Photograph: author’s own (2012).

![Figure 12: Third-Year Formal In-Class Review Session, Rural Studio](image)

Photograph: author’s own (2012).

Students’ new self-worldview is manifested in the known world due to their interaction and action, in different contexts, with different people. Diversity of built context, such as the studio classroom (see Figure 13 and Figure 14) and the external workshop (see Figure 15), can bring explicit attention to individuals’ inner worldview, as similar actions, such as learning-by-doing (see Figure 13 and Figure 15) are carried out in different environments. The impact of the context and the consequences of the learning activity can be reflected upon, encouraging assumptions and values to be reinforced or challenged.
Figure 13: Structure Class, Fifth-Year Studio, Rural Studio

Photograph: author’s own (2012).

Figure 14: Fifth-Year Studio, Rural Studio

Photograph: author’s own (2012).

Figure 15: Design Prototyping, Former Fifth-Year Students, Rural Studio

Photograph: author’s own (2012).
When students are required to collaborate, the social context (i.e., the group within which they are working) can affect the effectiveness of interactions, as the language and skills required change according to the activity. In the structures class (see Figure 13) students worked in groups of three to model and test their designs. This activity required students to trust their peers and their work as they used their own weight to test their strength. Students also collaborated informally (see Figure 14), working in groups in studio outside of formal classes. When those in the group are like-minded new self-worldviews are reinforced.

A different group of students were building a prototype of a design (see Figure 15), using part of the general assembly space at Rural Studio farm. These former fifth year students had been working together in the previous academic year, and had returned to complete the project. The progress of this project was on display for new students to see: a common situation at Rural Studio, where examples of previous students’ work contribute to the learning resources (e.g., other prototypes can be seen behind the space, Figure 15). As such, this form of collaboration is considered longitudinal, spanning a number of years, benefiting unknown future students.

Similarly, this longitudinal collaboration occurred when the architectural findings from one cohort were shared with subsequent cohorts. This allowed current students to build on previous students learning (see Figure 16). At Rural Studio, this was evident in the third year projects which are completed by different students over years. In working on the current stage of the project, students are required to refer to the research findings of previous students. In the work displayed in Figure 16 the images included were from the previous year. The students’ active contribution serves to increase self-awareness of their own learning, as well as heighten the likelihood of transformation of another’s worldview as a result of students’ effective communication.
As discussed in Chapter 3, and illustrated in Appendix A, the known-of and known worlds can also expand and contract as experiences, both direct and shared, contribute to the individuals’ body of knowledge and development of their worlds. The interaction between people that occurs through certain teaching practices, such as guest lectures (see Figure 17) and student presentations (see Figure 18) helps to share known-worldviews with others.

Figure 16: Student Work from Previous Years, Rural Studio

Photograph: author’s own (2012).

Figure 17: Guest Lecturers at the Fifth-Year Building Code Workshop, Rural Studio

Photograph: author’s own (2012).
The opportunity and ability to come together formally in class (see Figure 19) and informally (see Figure 20) strengthens communication and collaboration skills, as the situations in which these skills are practiced are numerous, and often repeated, but vary according to the task and social context (i.e., the peer review exercise seen in Figure 19 and the professional networking event in Figure 20).

Photograph: author’s own (2012).
The nature of the social groups that come together can also broaden communication and collaboration skills. Where social groups are complex and diverse, higher levels of communication skills are needed and collaboration becomes more challenging to navigate. Developing these skills can take time and the density or concentration of the social context is a factor, as was evident in discussions with staff.

‘I seem to be reasonably well known ... It could be that I’m passionate but yes, I know most of the architects in Wellington, which I quite like. When I was in London, you’re very much a tiny, tiny spec in the pond, whereas over here you get to know really everybody and what they’re doing, things like that. And so, having worked here for 10 years I also know quite a few of the contractors and a lot of the consultants, so I’m really well placed in terms of being able to link into different things.’


The scale of the social group can focus or broaden communication skill development. Communication skills focused on a particular language, (e.g., discipline-specific language often used in technical subject areas), can be introduced using traditional pedagogy (see Figure 21), discussed in small groups (see Figure 22) and mastered individually (see Figure 23).
Figure 21: Professional Practice Lecture, Victoria University of Wellington

Photograph: author’s own (2012).

Figure 22: Design Studio, Victoria University of Wellington

Photograph: author’s own (2012).

Figure 23: Computing Lab, Victoria University of Wellington
However, this focused language can become limiting in diverse or collaborative groups. In complex social contexts, while effective communication skills across a range of languages and modes can lead to increased understanding and heightened collaboration, the depth of understanding may be limited, unless the language is common to all. For the Firstlight Project and subsequent projects undertaken after graduating as First Light Studio (see Figure 24), the language used responds to a natural environment and physical context that is well-known to the public. The natural environment has a strong presence in Wellington and is easily accessible and well-used (see Figure 25).
The development of the core skills is evident in the interactions observed between staff, students and community. The maps, photographs, narratives and observations of the case studies presented in Appendix D.2 illustrate these interactions. The ways in which the core skills are used can be observed in the evidence is described in Tables 14-23 in Appendix D. Despite being able to use the evidence from these case studies of architectural learning to illustrate the development of core skills, the potential for transformation (i.e., the shift in values and worldview), is more difficult to document and understand.

5.3 Identifying Change in Transformative Experiences

Taylor (1997, 49) recognised that while the nature of the learning experiences themselves can be easily defined it is more difficult to clearly define the nature of the change that has taken place as a result of these transformative learning experiences. In the review of architectural education and educational theory literature discussed in this thesis (presented in Appendix A.3), it was found that the research focuses on the structure, format and content of the learning. When the outcomes of transformative learning are addressed in architectural education research, discussion typically focuses on the change in environment as a part of the learning outcome, the change in systems due to a change in context and theory, and a change in teaching practice. There is little focus on change in students and teachers themselves. In transformative learning discussions, the focus was on the immediate change in the student only as a result of a teaching practice or learning process, but there was no focus on the teacher, or the long-term impacts of this change.

Teaching practices and learning processes that provide opportunity for change are critical to support transformation. However, for transformation to be ongoing, the change must be easily recognised. In this thesis, the impact and influence of decisions made and the behaviour of both students and staff has been documented using students’ achievement of learning outcomes. This thesis recognises that it can take time for the change in worldview to manifest in individuals’ practice. In most architectural education programs in Australasia, educational needs are considered met, because the strict accreditation processes require that students obtain core skills and meet minimum levels of competency to graduate (Ostwald and Williams 2008, 141). However, it is questioned whether the experiences in these programs are transformative, as while there have been improvements in technology and regulation (The Allen Consulting Group 2010), the design and use of the built environment continues to
contribute to climate change. Analysis of the case studies has led to an understanding of how transformation in worldview, change, is prompted, supported and sustained.

Change, as a result of learning, was most evident at Rural Studio and Victoria University of Wellington. At Rural Studio, the change in the built environment as a result of the learning was clearly visible, as the students are able to complete the projects within the course of their study. The projects, which are examples of longitudinal learning experiences, were started by students in their second or third year and continued on through their fifth year and beyond. Such longitudinal learning connects the development of skills and knowledge across the entire duration of a student’s studies. This serves to make explicit the relevancy of prior learning experiences. These learning experiences can increase students’ awareness of their own development through reflection. As such, students can identify shifts in their own worldview, prompting change in behaviour. The built projects not only demonstrated the skills and learning of the student, but were used as learning tools. Mistakes or errors were evident, and they could be examined and reviewed to avoid repetition. In addition, successes were brought to the fore. The nature of the projects had ongoing relevancy, as students’ employed similar materials and types of construction (e.g., the steel construction of the recreational facilities in Lions Park [see Figure 26]), responded to similar situations (e.g., the natural environment at Perry County Park [see Figure 27]), or had similar briefs (e.g., the housing projects throughout the local community of North Ward, Greensboro [see Figure 28]).

Figure 26: Rural Studio Projects at Lions Park, Greensboro, Alabama
Lions Park Concessions 2009 (left), Baseball Fields 2006 (middle) and Surfaces 2007 (right)
Photographs: author’s own (2012).
These projects also supported the learning of the staff and the ongoing development of the architectural learning program itself, which was evident in the shift in direction and the change in content and skills prioritisation within the program. Initially projects were designed and built to meet a need for disadvantaged members of the community. This has served as a lesson, as some of the projects have not been well-maintained by those for whom they were built. Consequently, this has shifted the way in which the Rural Studio projects are focused. More recently, the community-focused projects endeavour to engender a sense of ownership within the community, by aligning with community groups rather than individuals or private owners. In addition to providing benefit for the community at large, Rural Studio also provides for their own needs. The Rural Studio farm projects have been implemented, in part, to demonstrate not only the commitment the studio has to the community, of which they are a part, but also that they provide for themselves as well as for others.
At the Victoria University of Wellington, the Firstlight Project is an example of the transformation prompted by learning. Although, it is worth noting that it has taken several years for the changes to develop and manifest themselves in practice. The students behind the Firstlight Project first met in design studio, wherein each student found a focus for their integration of design with the other curricula (e.g., cultural and applied subject areas). The project itself required them to develop skills of leadership, effective communication, and management skills. The success at the 2011 Solar Decathlon encouraged them to continue to reflect; meanwhile the four main members each completed their masters of research thesis. These students have since established an architectural practice together, First Light Studio, and continue to focus on performance and site-sensitive design successfully (see Figures 26–28).

Figure 29: The Meridian First Light House, First Light Studio

Photograph: First Light Studio (n.d.-c).

Figure 30: The Frontier Lodge, First Light Studio

The experiences provided by the program at the University of South Australia are similar to those at Victoria University of Wellington; however, the transformation in worldview is not as explicit. While students study sustainable development and apply the concepts learnt into their everyday practice (e.g. transit-oriented design and inner-city living) the results are not easily captured or reflected in the selected examples. Mawson Lakes has within it sound sustainable intent and strategies; however, the depth to which this has influenced more recent developments seen do not reflect the program’s priority on sustainable or responsive design (see Figure 32). However, the University of South Australia campus at Mawson Lakes does offer a point of difference; the architectural language used and behaviour evident seems more environmentally responsible (see Figure 33).
When the development of skills and knowledge is made explicit in the experiences within architectural education climate-responsible design is supported. The skills required for meaningfully learning, (e.g., making decisions and engaging with changing situations, both alone and with others) were identified in the learning activities observed. However, it has become evident that not all characteristics of transformative experiences in architectural learning can be found in architectural education. Further analysis is required to identify the types of learning experiences that can create opportunities for students to shift their worldviews and explicitly develop critical thinking, communication and collaborative skills. In Chapter 6, the evidence collected by contextual mapping has been reorganised to identify how the nature of the learning experiences can prompt change. The evidence collected accounts for the different events, situations, and activities that may support, prompt and sustain transformation. These are the events in which communication, collaboration and critical thinking skills are developed. In doing so, assumptions are challenged and unusual or unexpected insights are gained that can prompt a shift in worldview. Situations in which this new worldview is confirmed and supported consolidates this new position, and enables those involved to develop or change their position again. Activities that continue to develop these new skills and understandings serve to sustain the new worldview.
CHAPTER 6: FINDINGS: THE NATURE OF TRANSFORMATIVE EXPERIENCES

Transformative learning can be understood as a way of adapting to and prompting change within a system of learning, to ensure that the experiences within the system are meaningful. This chapter explains how the analysis of transformative experiences in architectural learning has led to the identification of the types of learning that are most likely to prompt, support and sustain transformation. Transformative learning experiences can be catalyst events that are uncommon, unusual or uncomfortable, which challenge individuals’ assumptions and beliefs. Some transformative learning permits a new or different worldview to develop, as experiences confirm a shift in values. Activities in which a sense of self and others is developed through shared experiences sustain transformation, as the skills and knowledge developed by and within the new worldview strengthen the shift in epistemological position. In this chapter the events that can prompt change, the situations that support change and the activities that sustain change are discussed.

Chapter 5 discussed the survey of information from the selected architectural education programs at Massachusetts Institute of Technology, University College London, Delft University of Technology, University of California, Harvard University and Southern California Institute of Architecture. The findings that emerged about the nature of learning experiences demonstrate the programs’ potential to provide transformative experiences. However, the understanding gained from this survey was limited as the methods used did not capture the dynamic nature of the system, the transformation that may occur over time, nor the way in which a shift in worldview influences and changes behaviour. However, during the researcher’s visit to the case studies of architectural learning at the University of South Australia, Auburn University, and Victoria University of Wellington, the documentation enabled change to be traced through time and the shift in worldview to be captured. This chapter discusses how analysis of these case studies of architectural learning has led to the identification of the dimensions of learning experiences, enabling the events, situations and activities that contribute to transformative learning to be defined.

The case studies of transformative experience that have been selected as examples of the systems of architectural learning provide potentially transformative learning experiences as part of their programs. They are discussed here as a means of looking for the learning experiences that prompt, support and sustain change. The case studies programs have been identified as ones that focus on different aspects of the relationships between the elements, such as the effect of the University of South Australia’s focus on sustainable development on
new developments in Adelaide; the impact of the architecture program and building performance research at Victoria University on local architectural practice; and the social outcomes of the projects completed for Rural Studio. While each of the programs differs in terms of situations and focus, they have all continued to be successful after significant periods of operation. In addition, the case study programs have had significant influence within their broader contexts and have been catalysts for long-term change. This contribution is due in part, to the design-build approach of the three case studies. This practical approach to architectural education is seen here as important. Design-build programs are often immersive experiences, requiring staff and students to spend time at a given location, usually off campus, and to work together as the project is constructed.

6.1 Dimensions of Transformative Experiences

The dimensions of time and scale, intensity and agency became apparent when analysing the dynamic system of learning. The time taken for the learning experience and subsequent transformation to occur can differ. A shift in worldview may occur slowly, and take time to eventuate or become apparent. At Rural Studio, the difference evident between third and fifth-years students had taken one to two years to manifest. The intensity of the experience and the influence of external elements and environments can affect the focus of those involved and consequently, the focus of the transformation. The observed community at Victoria University of Wellington was tight-knit, as most people lived, played and worked within walking distance of the campus. This resulted in the focus on design that responded to the specific situations in New Zealand (i.e., environmentally sensitive and seismic-resilient design). Agency—the ability and capacity of those involved to change and influence change—is critical to transformation. If the elements of the system are not able to be changed, and the interactions within the systems are unable to be responsive, the likelihood of change within the system is lessened. While the Firstlight Project has not been able to be repeated at Victoria University of Wellington, similar design-build programs have emerged when the staff involved have been able to integrate the experiences into the existing learning and research activities. Differences in these dimensions of time, scale, intensity and agency influence how, when and where the experiences prompted, supported, and sustained transformation.

Transformative learning systems are dynamic and change over time. It takes time for individuals within the system to know, know of and understand the world; comprehend the nature of change; and recognise the interactions that respond to and prompt change. For change to become evident to those involved in the learning experience, a prolonged focus, a
diversity of experiences or learning that takes place over a period of time can be effective. As evident in the documentation of the case studies of architectural learning (presented in Appendix D.2) these experiences can differ in density of interactions and the scale of the groups of people and communities involved. Many fast-paced interactions may be experienced in a large and complex context prompting rapid understanding (e.g., the third-year yard work activity at Rural Studio Table D.17). Opportunities for students to participate and share in multiple learning experiences and the change itself can be more easily created in longitudinal learning experiences, such as those undertaken by students for the Rural Studio Farm. The extended time taken to complete learning tasks allows for the influence of prior experiences to be felt.

It has become evident from the case studies that changes in the contexts effect the ways in which we understand our relationship with this context. However, this requires repeated or sustained experiences in that context, not singular visits that may be fleeting. An individuals’ understanding of their learning experiences can be increased when those involved are able to repeatedly experience those contexts over a sustained period, consolidating an emerging new worldview. This was observed when classes for different subject areas were held in shared spaces at Victoria University of Wellington. Additionally, changes in contexts can be more readily shared when the passage of time is expressed in the stories and sharing of experiences. Often, when sharing experiences, individuals may include descriptions of the contexts of those experiences which reflect what those contexts were like at that particular point in time. As such, these descriptions may not recognise change in these contexts over time. However, when staff at Victoria of Wellington were asked to reflect on past learning experiences, they described changes in social contexts that occurred over a period of time (Table D.20).

The intensity of the learning experience relates to the density or concentration of the contexts. Within the social context, the intensity is influenced by the types of people involved and their roles, and the size and complexity of groups within the system. Social groups in learning experiences can be large, but the apparent intensity is reduced when those involved are like-minded. This is a common situation within architectural education programs as the assumed abilities and skills are similar across those programs surveyed, (illustrated in the documentation presented in Appendix C.1). A group of a similar scale may feel more intense when the people participating come from diverse backgrounds and hold different worldviews. This was evident in the discussion with students at the University of South Australia, as students enter the Master of Sustainable Design come from different disciplines. The intensity of the experience can be heightened when individuals are required to adopt unfamiliar roles.
This was observed most effectively at Rural Studio, where students often taught newly mastered skills to their peers (e.g., the third-year yard work at Rural Studio Table 23) and conducted peer reviews (e.g., second-year technology class at Victoria University of Wellington, table 23).

The intensity of a social group can be influenced by the physical context. When different scales of learning spaces are available, different scales of groups are formed affecting the type of experience (e.g., the small, medium and large spaces pictured in Table D.19). Different scenarios were observed on multiple occasions during the visits to the case studies of architectural learning. When large numbers of people come together in a large space, the intensity of the experience can be mitigated as individuals move around and find a space that suits their needs. However, small groups of people in large spaces can limit interaction, as meaningful interactions become less likely in sparsely populated spaces. Both these scenarios were observed in the shared exhibition space at Victoria University of Wellington at different times. The intensity of an experience can increase when the space is small and more crowded, as those involved are forced to interact within the limited space (e.g., the professional networking event at Victoria University of Wellington). The built context can be physically dense (e.g., the diverse urban environments of the Bartlett, and SCI-Arc), or be intense in the predominance of one type or zone of use (e.g., the campus-based experience at MIT and UCLA). The educational context is intense when it is tightly focused on a clearly defined discipline, or when there is little opportunity for electives (e.g., MIT and Bartlett). Similarly, experiences of the natural context can be intense (e.g., where zones or areas of unmoderated environments are accessible). The intensity of experience can vary for individuals, depending on their prior experiences, abilities and worldviews. When there are differences between the expected or assumed abilities and worldviews, and those held by individuals, individuals may find the learning experience more intense because the quantity of skills and knowledge needs to increase to meet expectations. Alternatively, in situations when there are skills, abilities and worldviews that are commonly held by all the people involved, this can focus the learning on and around this point of view. Consequently, this similarity can strengthen an existing like-mindedness, affecting the likelihood of change.

Kolb (1984, 26) discussed learning as a process of adaptation and distinguished this from non-learning: the failure to modify ideas and habits as a result of an experience. The discussions in this thesis are informed by the analysis of the documentation of the case studies of architectural learning. These discussions focus on how individuals develop the abilities and skills required to respond and adapt to change, and how worldviews can be transformed through communication, collaboration and critical thinking. As such, it has become evident...
that it is not only the opportunity to change (provided by the learning experience), that is critical to transformation. The capacity to adapt and change is also needed for transformation to occur. This capacity to change is related to the way in which learning experiences are provided and the levels of decision-making and autonomy individuals have within the system. In a learning system in which the roles of those involved (i.e., students, staff and communities) are well-established and the interactions are tightly controlled, there may be little opportunity to respond to changes from outside and within the system. In some cases, this response is controlled by certain individuals, or limited by the boundaries of the contexts. Agency can be provided by accommodating different epistemological models, recognising different abilities and supporting multiple modes of communication.

It has been observed that in the case studies the newness or familiarity of experience can be determined by the roles of those involved as novices and experts. Learning experiences in which individuals shift from novice to expert can prompt reflection, and lead to experiences being understood in different ways and new meaning being associated with the experiences. This was observed at Victoria University of Wellington when students reviewed the work of their peers as part of their own assessment. Experts strengthen their point of view through familiar experiences; when their understanding is shared with others, the worldviews of others may shift. The lecture series, seminars and exhibitions commonly held as part of architectural education programs are examples of this type of experiences. Sharing of experiences with novices can also prompt a shift in the worldview of experts, as they are exposed to other ways of thinking and understanding through meaningful exchange and communication. Informal discussions with guest experts at Rural Studio illustrated how their teaching experiences informed and shifted some of their professional practices. At times, the roles of the expert and novice shift. Novices who are familiar with specific aspects of the learning experience may become an expert, despite normally fulfilling a novice role. For example, students or communities can undertake the role of the expert, redefining the typical teacher–student learning transaction, when they are actively involved in projects. This was observed at Rural Studio when one of the local residents, known as Music Man, explained his role when his house was being designed and built by Rural Studio students. This fluidity provides all involved with the opportunity to view the experience from another point of view, ultimately contributing to the challenge of the experience, and the potential for change.

Familiar experiences can help those navigate their way through the process of developing new skills and understanding, while strengthening their existing skills and knowledge. Familiar experiences, such as applying existing skills in known situations or communicating with like-minded others, can be meaningful when the physical environments
are new and those participating are prompted to see things differently. This is an often-felt experience among third-year students when first entering Rural Studio the program. Similarly, when new experiences occur in familiar contexts, the experience can encourage individuals to reflect on their experiences in these new contexts. This was observed when Rural Studio students visited familiar historical sites. They were required to look at and document aspects of these buildings and landscapes in new ways, prompting a shift in how they understood these social and built contexts. Sharing new ideas with familiar people, or familiar ideas with new people, leads to mutual understanding, especially when those involved share a common language. Architectural education develops skills in multiple languages: written, verbal, and visual. Learning to recognise that others have different levels of skill in each of these languages can prompt reflection regarding how to communicate effectively. The newness or familiarity of an experience is applicable to all elements within the learning system.

These dimensions of the learning experience (i.e., time and scale, intensity and agency) have informed the refining of the coding framework discussed earlier in this thesis. While it has become evident that not all characteristics can be found in all the architectural education programs, further analysis has led to the identification of types of learning experiences that are most likely to prompt, support and sustain transformation.

This Refined Coding Framework of Transformative Experiences (Table 6) has emerged from the analysis of the examples of current practice in architectural education and the case studies of learning experiences. The relevant elements and their associated characteristics are listed for each of the experiences, building upon the elements—the contexts of learning, the people involved, and the interaction that takes place—and characteristics from the original coding framework (listed in Table 3). Each type of experience provides different opportunities for those involved to shift their epistemological position and the ability to change is learned is also evident. The skills required for meaningful learning—the ability to make decisions and engage with new and familiar situations, individually and with others—are identified in the learning activities observed.

The documentation of transformative experiences in architectural learning discussed in Chapter 3 - the maps of multiple contexts of learning, the interviews of the people involved, and observations of the interactions that occurred—have been analysed and coded according to the methods used to create the documentations. Details of these methods of documentation and mode of analysis are presented in Appendix B. The transformative experiences observed and documented are described in Appendix D. However, describing all the examples from the documentation is beyond the scope of this thesis and therefore, selective examples of current practice and case studies are provided. When particular
experiences were provided in more than one program, those events, situations and activities that most aptly illustrate the characteristics of that experience have been described in-depth.

Table 6: The Refined Coding Framework of Transformative Experiences

<table>
<thead>
<tr>
<th>Experience Element</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>Boundaries—promoting interaction</td>
</tr>
<tr>
<td></td>
<td>Gathering spaces—places to come together</td>
</tr>
<tr>
<td>People</td>
<td>Scale of social groups</td>
</tr>
<tr>
<td></td>
<td>Intra-connected (likeminded)</td>
</tr>
<tr>
<td>Interaction</td>
<td>Between or within social groups</td>
</tr>
<tr>
<td>Events that prompt</td>
<td>Intense contexts</td>
</tr>
<tr>
<td>Context</td>
<td>Passive operable—encouraging interaction</td>
</tr>
<tr>
<td></td>
<td>Moderated—replacing lost environments</td>
</tr>
<tr>
<td></td>
<td>Being in place—knowing the world</td>
</tr>
<tr>
<td>People</td>
<td>Interconnected and intra connected</td>
</tr>
<tr>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
</tr>
<tr>
<td></td>
<td>New and familiar contexts</td>
</tr>
<tr>
<td>Context</td>
<td>Being in place—knowing the world</td>
</tr>
<tr>
<td>People</td>
<td>Intra-connected (likeminded)</td>
</tr>
<tr>
<td>Interaction</td>
<td>Role of individuals—novice/expert</td>
</tr>
<tr>
<td></td>
<td>Understanding via real or virtual experiences</td>
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<tr>
<td></td>
<td>New and familiar experiences</td>
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<tr>
<td>Context</td>
<td>Learning by doing—experiential learning</td>
</tr>
<tr>
<td>People</td>
<td>Interconnected</td>
</tr>
<tr>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
</tr>
<tr>
<td></td>
<td>Cognitive process - levels of thinking</td>
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<tr>
<td></td>
<td>Model of learning</td>
</tr>
<tr>
<td>Situations that</td>
<td>Integrated curriculum</td>
</tr>
<tr>
<td>Context</td>
<td>Passive operable—encouraging interaction</td>
</tr>
<tr>
<td></td>
<td>Prompting people to come together</td>
</tr>
<tr>
<td>People</td>
<td>Scale of social groups</td>
</tr>
<tr>
<td>Interaction</td>
<td>Between or within social groups</td>
</tr>
<tr>
<td></td>
<td>Learning individually and with peers</td>
</tr>
<tr>
<td>Context</td>
<td>Gathering spaces—places to come together</td>
</tr>
<tr>
<td>People</td>
<td>Scale of social groups—small</td>
</tr>
<tr>
<td></td>
<td>Intra-connected (likeminded)</td>
</tr>
<tr>
<td></td>
<td>Shared benefit</td>
</tr>
<tr>
<td>Interaction</td>
<td>Passive vs active—watching and doing</td>
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<tr>
<td></td>
<td>Learning by doing—experiential learning</td>
</tr>
<tr>
<td>People</td>
<td>Reciprocated benefit</td>
</tr>
<tr>
<td>Interaction</td>
<td>Passive vs active—watching and doing</td>
</tr>
<tr>
<td></td>
<td>Understanding via real or virtual experiences</td>
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<tr>
<td>Collective</td>
<td>decision-making</td>
</tr>
<tr>
<td>Context</td>
<td>Gathering spaces—places to come together</td>
</tr>
<tr>
<td>People</td>
<td>Scale of social groups</td>
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<tr>
<td></td>
<td>Shared benefit</td>
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<tr>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
</tr>
<tr>
<td></td>
<td>Developing sense of self/others</td>
</tr>
<tr>
<td>Context</td>
<td>Boundaries—promoting interaction</td>
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<td></td>
<td>Gathering spaces—places to come together</td>
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<tr>
<td>People</td>
<td>Scale of social groups</td>
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<tr>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
</tr>
<tr>
<td>Experience—</td>
<td>shared/personal; real/simulated</td>
</tr>
<tr>
<td>Context</td>
<td>Learning experiences—how, who and where</td>
</tr>
<tr>
<td></td>
<td>Being in place—knowing the world</td>
</tr>
<tr>
<td>People</td>
<td>Scale of social groups</td>
</tr>
<tr>
<td>Interaction</td>
<td>Role of individuals—novice/expert</td>
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<tr>
<td></td>
<td>Cognitive process - levels of thinking</td>
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</tbody>
</table>


Catalyst events that are uncommon, unusual or uncomfortable can challenge individuals’ assumptions and beliefs. Some catalyst events evolve into situations in which a
new or different worldview can develop, as culminating experiences confirm the shift in values. Activities within these learning experiences sustain transformation, as the skills and knowledge developed by and within the new worldview strengthen the shift in position. The types of the experiences—the events, situations and activities—that contribute to transformation and a shift in worldview, are evident in the case studies of architectural learning. Descriptions of where these experiences are found in the case studies can be found in Appendix D.

Each type of experience provides different opportunities for those involved to shift epistemology and worldview, and to become aware of their development of critical thinking, communication and collaborative skills. Within the evidence collected by contextual mapping, the experiences that prompted change can be identified. This requires opportunities in which the intensity, integration, newness and relevancy of the experience are considered. The understanding of the interactions possible between individuals is gained through modelling worldviews. Evidence of these interactions identifies how the sense and awareness of self and others can become explicit through shared- and real-world experiences. Ways in which the ability to change is learned is also evident. The skills required for meaningfully learning, to make decisions and engage with new and familiar situations, both alone and with others are identified in the learning activities observed.

The four contexts identified in the system—built, natural, social and educational—are defined in relation to architectural education and climate-responsible design. The different characteristics of these contexts found in the detailed mapping of these contexts are listed in Table B.4. Thematic analysis of the interviews identified the characteristics of the people involved in the program (Table B.6). The characteristics of the types of interactions that took place between individuals and across contexts are listed in Table B.7.

Architectural learning that contains the types of experiences listed in Table 6 is likely to prompt, support and sustain transformation in response to changing contexts. This refined coding framework of transformative experiences in Table 6 illustrates how these experiences may become part of an architectural education program. Each type of experience provides different opportunities for those involved to shift epistemology and worldview, and to become aware of their development of critical thinking, communication and collaborative skills. Within the documentation of evidence created for each of the selected architectural education programs, and the case studies of architectural learning, the intensity, integration, newness and relevancy of the experiences has prompted identifiable change. Descriptions of these experiences are expanded upon on Appendix D, in which the documentation of the case studies of architectural learning is used to demonstrate how the potential for transformation
can be increased through the events that can prompt change, the situations that support change and the activities that sustain change.

Events that prompt transformation—challenge individuals’ assumptions and worldview—are typically intense and contain both newness and familiarity. That is, intense interactions occur within new and familiar contexts. These interactions can engender the discomfort that increases awareness of change. The experiences that occur because of change can be unexpected. Unusual occurrences can make change more noticeable and apparent. Such events prompt the critical reflection that leads to a shift in worldview.

Situations that support transformation are those in which the people involved have high levels of agency. The capacity to change, developed by decision-making processes and the opportunity to learn individually and with peers, consolidates and affirms new knowledge and strengthens new skills. Time and intensity also influence situations. The timing of learning experiences, the alignment of focus and the complexity of the social and educational context reinforce new insights and understandings. However, this can only be achieved by effective communication and collaboration.

Activities that sustain change deepen the understanding of self and others. The development of a new sense of self and others is influenced by time and the intensity of the experiences. Activities that form part of the transformative experience provide opportunities to reflect and share using common languages and engaging communication. Consequently, the relationships that result from the activities are strengthened.

6.2 Events That Prompt Change

The types of experiences that prompt transformation are those that are catalytic, unexpected or uncomfortable. These experiences within architectural learning are evidence that the system itself is undergoing change. However, for those involved to be able to respond to this change, the change must be apparent to the individuals themselves. In some experiences, the contexts are intense by nature of the density of the built context, the diversity of the social groups, or the focus of the educational context. A change in the system can be identified by the introduction of new characteristics of the elements within the system, which differ from existing more familiar characteristics. Newness in context or experience, when balanced by elements of familiarity, can result in a shift in worldview, as the newness can prompt individuals to question of the familiar. Change in the system is evident in when the elements of the system change (e.g., new contexts emerge, additional people are integrated, or different interactions occur).
The intensity, newness and familiarity of the contexts and characteristics of events can make the development of core skills more explicit. Diverse and intense social contexts require high levels of skill in multiple languages to share experiences and meaning. Familiarity with some of these languages enables a richness of detail to be shared. Critical reflection is required for individuals express this detail in different ways, causing new insights to emerge and prompting a shift of the self-worldview, as well as the known worldview of others. Effective communication supports the collaboration needed in intense and diverse contexts, as people work together within the defined contexts to solve common problems and share experiences.

The pedagogical approach (discussed in Appendix B.2.3) can provide familiar or new experiences, depending on the background of those involved. Increased familiarity can promote novices to experts, which then supports peer-to-peer learning and critical pedagogy. New situations and contexts can promote the development of new language skills, or support underused skills to be strengthened.

If the opportunity is provided, an andragogical approach—a student focused learning process in which the teacher facilitates and guides student—can be taken and learning can be applied to the immediate environment and everyday activities. Increased density and time spent in the situation increases knowledge, allowing the novice to transition to an expert in the specifics of that context. The language skills needed include the visual, architectural, social, and emotional, as interactions intensify and develop over time.

The newness or familiarity of experience can affect the effectiveness of the learning. New experiences are important to transformative learning experiences, as they prompt a change in values or worldview through disruption and challenge. Familiar experiences support learners and serve to reinforce and strength existing interactions. This newness and familiarity of experience is related to the contexts of learning for all participating within the learning system, including staff and students.

When considering the contexts of the experience—the built, natural, and social—if one or more of these contexts are new, the experience prompts a challenging of previous experiences and meanings. However, if all the contexts are new, it is likely that those involved are unable to build upon previous experiences and meanings. While completely new experiences are profound and intense, the potential to challenge the meaning made from previous experiences is limited. However, if one of the contexts is familiar (e.g., a new space is experienced with friends, or a familiar space is experienced with strangers) new insights and understandings about the experience are formed.
6.3 Situations That Support Change

Situations that support transformation provide the opportunity for individuals to consolidate their shifted in worldview, and strengthen the skills needed to support the transformation. The extent to which the contexts are integrated within the learning experience, such as the immersive experience observed at Rural Studio, supports the transfer of knowledge from one domain to another, as understanding gained in one area can be applied to another area, including new areas. Situations in which learning outcomes are shared makes the learning process visible to all, increases awareness of self-learning, and promotes recognition of the progress made by the group as a whole. Existing skills and abilities, as well as the shared development of new ones, are accommodated by being able to learn individually, as well as with and from peers. Learning with others who are experiencing a similar shift in worldview, or now hold the new worldview, can assist individuals to overcome the associated challenges. The capability to reflect critically together as part of the decision making process strengthens communication and collaboration skills. Examples within the three case studies of the different ways and scales in which this can take place can be found in Appendix D.

The ways of sharing experiences are important to identify opportunities for individuals to shift their experiences from the known-of world to the known world and to understand the motivations and situations that can prompt transformation. Typically experiences of, and in, architecture are shared through visual media and the spoken word. These are common methods for sharing designed experiences within architectural education programs. However, evidence from the case studies illustrates other effective methods of sharing experiences in the different learning activities directed by the staff members, including the use of spaces for more than one subject area. Staff members can direct and participate in different types of learning activities and spaces can be used for teaching and learning in more than one subject area. Additionally, there is the opportunity for different pedagogy when integrating the curriculum, depending on the situation. Peer learning situations support the multiple roles of those involved in learning experiences. When learners apply their skills in multiple languages, it assists the application of theories and concepts learned in one area of the curriculum to another. The multiple viewpoints that emerge through sharing experiences also deepen the learning experience in its entirety.

Providing the opportunities for self-awareness of learning and change can happen at an individual level as well as a community or social group level (Karol and Mackintosh 2011). Increasing the awareness of self and group development supports a critical pedagogical
approach, as individuals are encouraged to monitor, reflect and adapt during the learning process. Events, such as displays and formal exhibitions, promote a novice to an expert, and may prompt the expert viewer to consider themselves novices in work that challenges and provokes. Typically, awareness of progress is articulated explicitly through traditional modes of communication—visual, written and spoken. However, it could be argued that in some programs, such as design–build programs, progress and outcomes are made explicit through action and practical application.

Situations must be provided for individuals to hone their skills and strengthen their understanding alone to allow the new worldview to further develop. Conflicts and confusion, when given time and appropriate space, can be resolved. For some people, and some learning processes, this is best done individually in situations wherein the consequences of failure are minimal and the opportunities to practice and consolidate are numerous. Situations in which the learning is focused on the development of collaborative skills ensure the interaction between peers provides critical feedback and direction. Other like-minded people, who hold the same or similar position, and have expertise in the skills to be developed, can support the consolidation of the transformation. Small informal groups, in which the risk is low, are common characteristics of these situations.

6.4 Activities That Sustain Change

Transformation can be sustained by activities that strengthen individuals’ sense of self and their relationship with a clearly defined community. When the shift in worldview has resulted in a new understanding of self, the positioning and relationships with existing communities can be affected and thus, new relationships to be established within the new community if the transformation is to be sustained. The sharing of personal experiences, whether real or simulated, and reflection on these shared experiences reinforce these relationships and contribute towards the understanding of self and of the identity of others. Activities in which the content is closely related to an immediate task can also reinforce new relationships and worldviews and sustain change as the new worldview is applied and tested in other situations.

The content of learning is one of the key criteria of assessment in many formal learning experiences. However, the evidence collected through the mapping of the contexts indicates the importance of the social environment of learning. In many architectural education programs, the development of collaboration skills relies on group-based assessment. Balancing the development of these skills with the program’s assessment
requirements of the individual student is a common difficulty. The case studies have provided evidence of how these skills can be supported through social and community learning, while supporting individual endeavours.

Making the immediate learning experience relevant to other recent experiences supports the pedagogical and andragogical approach to teaching and learning. When the content is relevant to one or more of the assessment tasks across the curriculum, or new skills and knowledge are required to be demonstrated in more than one study area, the learning experiences in each of the discrete classes is more likely to be meaningful. Activities that sustain change are likely to be provided as a part of critical pedagogical practices. Those involved become more self-aware and develop a clear understanding of relationships through activities in which they are required to think critically about themselves and others. This is demonstrated through the sharing of experiences with individuals from diverse backgrounds or with differing language skills. When learning has benefit to those beyond the individual learners, the sense of collective and community responsibility can sustain the worldview, as newly formed positions are reinforced through repeated activities and affirmed through interaction with individuals who have been through similarly transformative experiences.

Activities in which broader communities are involved as both novices and experts can be part of formal learning experiences. This can include activities in community places or inviting communities into the education spaces. This requires a distinction to be easily made between community places and architectural learning spaces, and between members of a broader community and those of the immediate architectural learning community. Such distinctions are made when a sense of identity is developed and becomes easily discernible in people as individuals and as communities.

Architectural learning that contains events that can prompt change, the situations that support change, and the activities that sustain change is more likely to be able to respond to changing contexts. Events that prompt transformation—those that challenge individuals’ assumptions and world view—are typically intense and contain both newness and familiarity. These unexpected or unusual occurrences are often the changes in the learning system that prompts the critical reflection that leads transformation. Situations in which people have high levels of agency and the capacity to change supports transformation. This capacity to change is developed by collaborative decision-making processes and the opportunity to learn individually and with peers. These situations consolidate and affirm new knowledge and strengthens new skills. Activities that sustain change deepen individuals’ understanding of self and others. Activities that form part of the transformative experience provide opportunities to
reflect and share using common languages and engaging communication. Consequently, relationships between those involved in the activities are strengthened.

The nature of transformation can be recognised primarily within the individual, but also within the system in its entirety. Those involved demonstrate an immediate change individually. Local change is developed in the intermediate term. Long-term change can occur at a global level. Changes in the learning system become apparent as the processes, rather than outcomes, are prioritised. In addition to the initial changes in the people and system, the experiences that sustain the change must also be present, such as problem-finding activities and effective communication through a common language. Critical to this is the provision of agency for all those involved, the ability to change, and the capacity to change. Learning experiences that contain these elements are likely to support the development of skills and understanding required for the provision of climate-responsible design.
CHAPTER 7: DISCUSSION: TRANSFORMING ARCHITECTURAL LEARNING

This chapter explores how the potential for strategies that prompt, support, and sustain transformative experiences can become a part of architectural education programs and increase the potential for change. The model of a dynamic system of learning, presented in this thesis, offers a way of understanding the development of critical reflection, communication, and collaboration skills needed for the complex understanding that supports and sustains climate-responsible design. The documentation of evidence gained in the case studies of architectural learning at University of South Australia, Auburn University, and Victoria University of Wellington (Appendix D) has been used to explore how transformative learning supports the development of these core skills. As those involved take different roles and challenge themselves, their agency and capacity to change is increased. When people from diverse social contexts are included, the broadened understanding of others and self supports collaborative practices. Transformative experiences in architectural learning enable designers to think critically about their experiences and set collaborative goals with others in response to problems or issues that arise. A common language is developed collectively by communicating ideas and concepts in ways that are easily understood by others from new and unfamiliar contexts. The change that occurs within a dynamic system can be contextualised and understood through reflection and the sharing of experiences. As such, transformative learning experiences support a flexible, but purposeful, positioning of worldview that engenders decisions that are of mutual benefit to self and world.

This chapter discusses the analysis of this evidence documentation which has enabled the change in the contexts, people and interactions within the programs to become recognisable. Three changes have been identified in this documentation—immediate individual change, local change that emerged over the intermediate term, and long-term systemic change. In the case studies of architectural learning, these changes were prompted by catalytic events, supported by situations consolidated the changes, and sustained by activities that strengthen relationships. The integration of these events, situations and activities into these architectural learning experiences may not have been deliberate or intentional, but part of the intuitive practices of the teachers and leadership teams of the programs. This intuitive process is strengthened through the reflective practices of staff as they collaborate to develop their programs. Repeating these exact details of these programs does not guarantee transformation; this insight was clear to the leadership team at Rural Studio. However, as staff, students and communities learn to recognise and respond to
change, they become more resilient and adaptable. Embedding these learning strategies in architectural education can enable those involved to develop the ability to respond to change in the future.

7.1 Looking for Transformation in Learning Experiences

Taylor (1997, 49) noted in his review of transformative learning experiences that it was difficult to define the outcomes of perspective transformation in the case studies reviewed. Some, such as Mezirow (1994), considered the outcome to be an observable and identifiable change in behaviour, which manifested in new roles and relationships. However, some studies reviewed by Taylor (1997, 49-50) found this too narrow a definition and what had been previously considered a change in behaviour was redefined to include both behavioural and psychological changes. Changes—such as increase in personal power; increased compassion for others, or a new connectedness with others—are more explicit, as evidence of the change can be easily observed in behaviour and lifestyle. Psychological changes—such as the increased understanding of oneself, convictional changes observed in a revision of a belief system, or an increase in self-confidence—are often more implicit, but are more likely to influence and inform the observable changes. This broader definition of change is used in this thesis to not only identify the change catalysed by learning experiences, but also to inform the aspirations and intent of future architectural education programs.

When considering the case studies at University of South Australia, Auburn University, and Victoria University of Wellington, the observed behaviour of staff, students and recent graduates of the programs displayed evidence of three of the identifiable changes in behaviour: confidence in new situations or at levels higher than expected, increased commitment and compassion for others, and higher levels of active connectedness with diverse groups. These behavioural changes took place within social groups of different sizes, occurred over different time frames, and had a perceived impact not only on self but also on others (e.g., peers and community). The dimensions of transformative experiences (discussed in Chapter 5) are used in this chapter to acknowledge the different ways in which change manifests, and the different outcomes that are possible. Time and scale are prioritised in this discussion, as these dimensions allow for categorisation that is concise. The three time frames -- immediate, intermediate and long term—recognise that within the complex and dynamic systems of architectural learning, some outcomes take longer to emerge. The three different scales of social groups—individual, community and system—have been informed by the systems approach taken in this thesis. As such, time and scale has focused the discussion on
three types of outcomes of transformative learning experiences. The other dimensions—intensity of experience and agency—influence outcomes across the dimensions of time and scale, and therefore, are evident in the discussion of each of the three outcomes.

7.1.1 Individual Transformation: Immediate Change

Change, though it may occur over different periods of time, can have immediate effect on the individuals and the system, as it can affect the way in which the interactions between individuals and across contexts take place. Critical thinking skills help individuals to develop an increase in confidence, as decisions made are reviewed, tested and successfully implemented or revised. This increase in confidence serves to consolidate the change in worldview, prompted by collaboration. Along with this increased confidence is the awareness of the capacity to develop and explore. This serves not only to sustain the new position, but also to prompt further transformation in response to the ongoing changes in the system. Communications skills, primarily literacy skills that enable new insights to be gained from experiences within the existing system, can result in more opportunities for change being identified.

At Rural Studio, the skills learned during the yard work exceeded the construction skill development that was immediately apparent. As students were encouraged to move around and explore, they quickly ‘found their fit’ and gravitated towards tasks and environments that suited them. Informal discussions with the students indicated that some, while finding the tasks challenging, were pleased they had pushed themselves and accomplished the task at hand. From the experiences observed, it was evident that encouraging students to become self-reflective and self-aware, so they can acknowledge and find their fit, supported the development of additional skills, such as leadership. Students who had challenged themselves took pride in displaying their new skills to their peers, and seized opportunities to share their newfound skills and understanding. These students also demonstrated resilience, as they worked through challenges as they completed the project tasks.

The fifth-year students at Rural Studio exhibited a confidence that was not evident in third-year students. While some of this confidence comes with an increase in age and maturity, this confidence was observed to extend beyond that documented at other architectural education programs. In weekly meetings with staff, the fifth-year students explained how they had negotiated the cost and supply of materials for their planned build, met with community members regarding design intent and progress, and consulted with local artists and practitioners. In doing so, they demonstrated the skills and abilities that are listed
as professional competencies for registration (Architects Accreditation Council of Australia 2015), a process that can only occur within two years in practice in the profession.

The tasks completed by the students at Victoria University of Wellington for the Firstlight Project required similar levels of confidence and self-awareness. The project and team management, research project definition and completion, and the negotiation with the university regarding funding and support took skills beyond those normally expected of students. The four leading members of this team completed their masters theses on the same project; each member explored a separate element of the project. This required an awareness of their own skills and capacities, as well as those of their peers. As such, they had the opportunity to develop their individual skills while collaboratively completing the project. The four team members have established an architectural firm with one of the staff members who supported the Firstlight Project (Victoria University of Wellington 2011). This not only reflects confidence, but also provides evidence of ongoing connectedness with others. This is also significant considering the team members did not know each other prior to the project’s initiation. Additionally, this is also significant as of the 19 teams entered in the 2011 Solar Decathlon competition, the Firstlight Project team is the only one to have demonstrated such a rapid development of professional practice (U.S. Department of Energy 2015).

During the visit to the University of South Australia, it was clear that the individual students and staff were strongly connected to community and those with similar convictions. The interviews with staff and students highlighted the value placed on sustainability, and this commitment extended beyond their academic activities. Staff were involved in long-term community projects that enable them to apply their research and teaching to their everyday experiences. Students were involved in community events and presented at professional networking events. As these activities sat outside of the formal learning experiences, the connections made with others socially and professionally are difficult to connect to the immediate and individual learning experience. However, these experiences exposed individuals to like-minded people from non-architectural backgrounds, providing the opportunity to apply familiar arguments to new scenarios and contexts.

7.1.2 Community Transformation / Intermediate Change

Changes that occur at a local group or community level take longer to become evident, and thus, take longer to influence change in the system. Although social groups are formed, established relationships shift as new positions are taken; as such, opportunities for connectedness with others increase. Becoming aware and understanding the impact of
changes requires communication and collaboration. Through effective communication and collaboration, the values and needs of others can be made clear. This increased awareness engenders a commitment and compassion for others, which results in these new relationships becoming meaningful and beneficial to self and others. When tasks are linked to their immediate contexts, engagement is supported. This occurs especially when the outcome of learning is focused on community needs, rather than individual needs.

At Rural Studio, the introductory yardwork activity meant that third-year students were actively involved in building on previous students’ work and directly contributed to the Rural Studio farm community. The tasks served to introduce the skills and knowledge that would be developed in the ensuing semester and future studies, if students chose to return in their fifth year. Thus, the learning activity was directly related to their own community, as well as the local community. As such, the fifth-year students exhibited compassion for others that extended beyond their individual studies. During my visit, there were two groups of ‘leftover thesis’ students who had elected to stay on beyond the completion of their formal education, so they could complete the project they had started as part of their studies. Some students were in their second leftover year, having graduated two years previously. This commitment to their project required them to forgo or delay the personal benefits of graduation, such as professional experience which leads directly to professional registration.

At Victoria University of Wellington, the formal learning activities focused on the threat of imminent earthquakes, and the effect that earthquakes might have on own and broader community. The works on display in the studios illustrated an increased compassion for others; the projects’ outcomes extended beyond the educational context and had benefit for the wider community. Additionally, the environmental commitment of the Firstlight Project continues in the teams’ vision that ‘technology and sustainability should not only be affordable, they should also meld around how we live’ (First Light Studio n.d.-d). This vision statement demonstrates how the individuals from First Light Studio support others to make their own behavioural and lifestyle changes.

The projects at the University of South Australia program, in which students interact with rural or remote communities, however, did not have as visible or as immediate an impact. While the benefit for the community was evident, the community was removed from the university’s own community. Transformation within these remote communities was limited to the built environment (see Figure 34) which may not necessarily change worldview or behaviour. This limitation was also observed for some of the Rural Studio projects, wherein the responsibility for the final constructed project rest with the owner, not the occupant. This can result in the project becoming neglected or poorly maintained (see Figure 35), as those who
occupy the building do not have the agency to make ongoing change. When the outcomes of architectural learning are disconnected from the potentially transformative experiences in this way, the change that does occur is more likely to remain in the context in which it occurs. For example, if change is made to the built environment for a community, but does not necessarily engage that community in a longer term activity, then the change is unlikely to transfer to other elements of the learning system.

*Figure 34: Design and Construct Project, University of South Australia*

Photo: University of South Australia (2014).

*Figure 35: Akron Boys and Girls Club, Rural Studio, (2001),*

Photograph: author’s own (2012).
7.1.3 Systemic Transformation / Long-term Change

Systemic change can come about through changes in the different elements—the contexts, the people and the interactions. People interact with and influence each other in different ways, changing the contexts as a result. Alternatively, change in the context can change the nature of the interactions if the worldview that informs these interactions is shifted. In addition, the hierarchy of the contexts within the system may also change as worldviews shift and priorities change. For the system to change, however, the people within the system must be aware of the transformation in themselves, in others and in the system itself. This increase in awareness is supported by critical thinking skills, particularly critical self-reflection, and can be prompted by communicating and sharing with others, resulting in an increased connectedness.

At Rural Studio connectedness with others was particularly evident among the staff. Some members of staff were graduates of the Rural Studio program and had stayed on or elected to return. When interviewed they recognised that their relationships with the students and local community were the primary reason for this. A strong sense of identity and connection is supported by the complex social context in which different social groups interact. At Victoria University of Wellington, the team who initiated and lead the Firstlight Project also developed strong professional connections as a part of their learning process. Evidence of this is found in the sustained involvement of practitioners in the teaching program at Victoria University of Wellington, especially those who have strong connections with the learning and local communities.

Learning experiences that contain the key transformative experiences are likely to prompt, support and sustain positive response to changing contexts. The types of experiences that prompt transformation are catalytic, unexpected or uncomfortable events. Situations that support transformation provide the opportunity for individuals to consolidate their shifted in worldview, and strengthen the skills needed to support the transformation. Transformation can be sustained by activities that strengthen individuals’ sense of self and their relationship with a clearly defined community. The documentation of the transformative experiences observed at the case studies of architectural learning is presented in Appendix D, and described in further detail. In this documentation, the nature of transformation was recognised primarily within individuals, and within in the system as a whole, using the methods discussed in Chapter 4. Changes in the learning system become apparent as learning processes, rather than outcomes, were prioritised. The experiences that were evident within
the learning processes visible in this case studies have been used to inform the strategies for architectural learning.

7.2 Strategies for Architectural Learning

Transformative experiences in architectural learning enable designers to think critically about their own experiences, and, in response to changes that occur, to set goals in collaboration with others. A common language is developed collectively by communicating ideas and concepts in ways that are easily understood by others from new and unfamiliar contexts. The change that occurs within a dynamic system can be contextualised and understood through reflection and the sharing of experiences of ourselves and others.

The discussion in this thesis argues that three core skills—communication, collaboration and critical thinking—are needed to understand the worlds in which we live and thus, it is essential to develop these skills in architectural education. The application in this thesis of the methods of examining architectural learning has demonstrated that there is a relationship between how these three core skills are developed within transformative experiences (i.e., the events, situations and activities of the learning experience). The designed outcome is influenced by the worldview of the designer and their ability to acknowledge and respond to the worldview of others. When all people engaged in the design process share a common language communication skills are strengthened through meaningful collaboration.

The theorists, Simon, Alexander, Ishikawa and Silverstein, and Schön, discussed in Chapter 2, regard design processes as critical to transformation. Each theorist developed their position in response to changes in the world and the ways in which we live in it. Although their arguments are founded on different points of view, there are similarities in their arguments. All focus on a process of design, not only as a means to an architectural end, but as a way of knowing self, others and situations. This focus is evident in the three learning strategies presented in this thesis as a means of supporting the development of these core skills in architectural learning. These strategies have been identified as goal setting or problem finding; collective understanding through a common language; and the role of the process of design as a catalyst for change.

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17 Schön (1983) argued that this process of design occurs through reflection-in-practice; Simon (1969) argued that it occurs through the understanding of situations and the properties and performance of the elements; and Alexander, Ishikawa and Silverstein (1977) argued that it occurred through the sharing of experience.
7.2.1 The Importance of Setting Goals and Finding Problems

Critical to the discussion of goal setting and problem finding is the definition of the goal or problem. In this thesis it has been observed that this is often not the case in architectural education. Typically, many elements of the problem are already defined in preparation for the learning activities. Consequently, the ability to define or set goals, critical to the design process in architectural practice, is not always addressed explicitly. Problem or goal setting relies on an ability to understand both the known world and the known-of world, so knowledge can be transferred from one world to the other. This understanding can be used to develop the self world, as individuals challenge their assumptions throughout the decision-making process.

Understanding shared experiences relies on the ability to effectively communicate the experience to others, but also to comprehend the experience of others. Communication, including exchange and interaction, occurs in many ways, according to the relationships within the system between those involved and the contexts. Effective communication requires an awareness of one’s own skills and abilities and a predisposition to challenge and develop new skills. These new skills can be acquired by applying familiar skills to a new situation, or applying discipline knowledge to everyday situations and problems. Certain skills and knowledge are best gained through traditional pedagogies, such as lectures, research, and collection of information. Application of these skills and knowledge in real time to a project-based task strengthens the impact of the learning and development of metacognitive skills. Consequently, this process supports a shift in values and change in behaviour beyond the classroom. Internal reflective practice requires skills of self-expression, supported by high levels of personal or social intelligence.

Schön (1983, 21-30) perceived the technical rationalist approach as one of problem-solving, in which the decision-making process involved the selection of the appropriate means to achieve an established end. As defined by Simon (1969, 15), the artefact (in this case, the architecture) is designed to adapt to an identified goal, or to fulfil a stated purpose. To define the goal or problem, or state the purpose of the architecture, the designer must understand either the environments in which the architecture is to be sited, or the way in which the architecture performs to reach the goal or fulfil its purpose. ‘A Pattern Language’ (Alexander, Ishikawa, and Silverstein 1977) relies on the definition of problems and the process of solving them as a way of understanding the world. Only then can the world be changed, expanded and recreated. The commonalities between defined problems and their solutions influence the way in which the design of the architecture affects the use of the building. Schön (1983) described the process of problem setting as one in which problems are constructed from puzzling or problematic situations, to make sense of these uncertain situations.

Intrapersonal intelligence, the ability to understand self (Gardner 1993, 24-26), is honed by internal reflective practices, wherein the individual learns to express their processes to others. Interpersonal intelligence, the ability to understand others (Gardner 1993, 22-23), ensures that the knowledge that is being expressed is able to be understood by others.
In the architectural education programs international study tours, design-build programs and community-based projects increase the potential for transformation as they provide the social processes discussed by Mezirow (1994)\(^{21}\). This learning-by-doing (i.e., experiential learning) reflects the more meaningful process of transformative learning discussed by Atkin (1999), in which the learner is engaged and the learning is grounded in the real world and experience. With the support of an integrated curriculum, reflecting critically on these real world experiences from different viewpoints can prompt new or revised interpretation of experience, leading to change in behaviour and understanding. When this learning occurs collectively, common knowledge is produced through the sharing of experiences and worlds. In groups where those involved (students, staff and community) come from similar backgrounds, this collective learning strengthens like-mindedness. The research undertaken in this thesis has indicated that like-mindedness relies implicitly upon knowledge common to all within the learning community, even knowledge that is often not explicitly recognised. It is assumed that all of those involved understand and know the same thing in the same way. Similarly, assumptions are made about an individual’s abilities and capacities. It is generally expected that members of a like-minded community have the same or similar abilities, can communicate effectively, and come to the same or similar understandings. Given the range of abilities and the multiplicity of languages and literacies present in diverse and broad learning communities, it is likely that effective communication leading to common understandings is difficult. Recognising the diversity in ability and differences in communication can help to identify the action needed to achieve the learning objectives. When this process occurs collaboratively, the value reorientation of individuals can result in a new a common sense of purpose beyond the learning objectives, prompting the setting of a common goal through shared understanding. The analysis of the documentation of the case studies of architectural learning has provided additional insights to how common goals were set within the programs.

There was evidence of a common sense of purpose at Rural Studio that related not only to their desire to succeed in their studies, but also to the increased sense of responsibility implicit in the projects themselves. While the students were working on a project to benefit Rural Studio farm, it was clear that this could lead to a more public community project, such as those run worked on by the fifth-year students. There was also a sense of collective unity.

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\(^{21}\) According to Mezirow (1994, 222–3) ‘the social process of construing and appropriating a new or revised interpretation of the meaning of one’s experience is a guide to action’. 

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because it is made clear to the students that work they are doing will be referred to and relied upon by future students, as the longitudinal project extend beyond their single semester of study. This is reinforced by the fact that they are required to refer to the work of previous students as part of their research and analysis of their own projects. These practices result in a common approach to problem-solving that is unique to Rural Studio.

A common sense of responsibility was also reflected in the focus of the student work At Victoria University of Wellington. Parts of New Zealand have been affected by earthquakes, which have left a significant impression on people’s lives, and the built environment. Students’ identification with this was observable. The focus on compliance and building regulations was understood as a barrier or a constraint by students, staff or visiting professionals. Instead, in some cases, it became the source of inspiration. It seemed that recent events had increased the relevance of these considerations for students, and thus the potential to shift students’ attitudes towards the issue.

Abilities in some of the intelligences defined by Gardner (1993) (discussed in Appendix A), can strengthen and deepen the understanding of the various contexts in which architecture occurs, and responds to. Understanding the social context requires knowledge of the characteristics of the social group, the way in which those within the group behave and the way in which the architecture performs in response to this. High levels of emotional intelligence could be considered an advantage in developing this knowledge. Gaining an understanding of the natural environment beyond the positivistic or scientific approach may be more attainable for those with naturalistic abilities, as the relationships between the elements of the natural systems, the patterns and the features may be more apparent. Mathematic abilities may be an advantage when seeking to gain an understanding of the built context, such as the patterns and underpinning logic of urban contexts. Practical or contextual abilities may assist in determining the relationship between architecture and the contexts and thus, the definition of the required function or purpose of the design. Self-reflection and critical analysis can be easier for those with high levels of emotional intelligence, self-awareness of own emotions and ability to moderate and control (Mayer et al. 2012). Self-reliance and independence is supported by practical intelligence: the ability to solve everyday problems without the assistance of machines or technology (Wagner 2012).

This problem-solving ability is evident at Rural Studio, where yardwork provided opportunities for individuals to reflect and think critically about their own abilities and those of others (see Figure 36). While all students elect to participate in Rural Studio, this event made explicit the challenges that could be expected. For those who respond to these challenges set in the yardwork, further opportunities were offered. In doing so, students discovered how
their strengths and limitations were similar or different to the others. Recognising different abilities in themselves and others was important for members of Firstlight Project who were aligned in their worldview. Each member was able to find their own unique position within the project that suited their strength in a previous design studio. These strengths were developed during the Firstlight Project and the subsequent individual research projects.

Peer learning, reinforced by a shift in role from novice to expert, is an opportunity for students to better understand how they and their peers have responded to the challenges set. Exposing newcomers to the program, such as for exhibitions and displays of student work, encourages novices to observe and reflect. This reflection is catalysed by making visible the process that has led to achievement of final outcomes. Opportunities to work in groups of differing size across the educational context impacts the type of engagement. Vertical integration across year groups exposes novices to multiple points of view and ability, which can influence and be explored in their own work. Horizontal integration, supported by a space that is common to a year group, prompts informal peer learning across the curriculum. When opportunities such as the fifth-year research project arise, the students are well equipped to choose their own direction, as they have been exposed to a diverse range of student projects throughout the architectural education program.

### 7.2.2 A Common Language Developed Collectively

The sharing of experiences and expression of ideas though effective communication is considered in this discussion to support the transfer of knowledge from one world to the other. The knowledge of the known-of world may contradict individuals’ known worldview. Similarly, experience in the known world may challenge an individual self-worldview. Understanding these conflicts and making sense of them is a critical part of learning, achieved through meaningful and effective communication. Meaningful communication requires
individuals to have a common language; when the people involved in learning come from
different backgrounds, this common language emerges as people relate and retell their
experiences. Common elements of language emerge as regular aspects of a learning
experience (i.e., the events or contexts) are the most likely to be retained and remembered.
The contribution these narratives can make to the transformation of others can depend on
how the narratives are understood. Some experiences are best told verbally, while others are
better represented visually or graphically depending on the background and the abilities of the
teller and the learner. These languages become the method of coding (i.e., making meaning
from) the lived world of experience described by Alexander, Ishikawa and Silverstein.  

The insights gained from experience can be more easily shared when the learning is
visible, progress is shared and the language is familiar to all. Language becomes the symbol
system described by Simon (1969), used not only by the designer to create knowledge, but also
by those who use and experience the designed artefact (i.e., the architecture).  
Providing
opportunity for staff and students to review and reflect upon their own abilities and insights,
as well as those of others, can bring to the fore issues and problems that may not have been
evident before. Schön (1983) made the distinction between internal reflection and the
reflection on others’ action, wherein descriptions of situational observations lead to the
emergence of theories about what is happening in these situations. 

An understanding of how these insights were gained can be achieved through
documenting the progress of learning and capturing the processes involved. In an example
given in A Reflective Practitioner a teacher explained his thoughts as he sought to solve a
particular design problem, making the design process explicit (Schön 1983). When students
at Rural Studio were asked to work in groups to design a project, it was distinctly a
collaborative effort. In small groups, they each drew on the same piece of paper, bringing their

22 In proposing a cascading language of architecture that can be used to ’make a project’, Alexander
quoted in Dovey 1990, 4) described patterns that becomes a method of coding the existing fabric in
response to the way in which the community uses existing places and associates meaning.
23 Simon (1969, 27) identified a symbol system in which the knowledge of the outer and inner worlds is
used to influences behaviour.
24 Schön’s (1983, 61) discussed reflection-in-practice as requiring the practitioner to criticise the tacit
understandings and knowledge that underpins their practice. This internal reflection requires the
explicit naming of the problems and the framing of the contexts.
25 The student learned through observing this act of designing and from the explanation offered by the
teacher as the designing occurs. However, this learning is possible only if the language used is
understood. While the internal reflection expressed by the teacher can bring to the fore his own
knowledge, the benefit for the student as observer relies on a common language. The act of explaining
while acting can serve to develop this language, as meaning is more easily associated when the actions
and interactions are visible. When the student completed the design problem, the learning gained
through observation can be expressed as the student shared their own reflections with others (Schön
1983).
own ideas and solutions together to solve the problems (see Figure 37). Sharing their understanding of the issues, explaining to each other how they have come to their solution, and listening to others ways of understanding the same problem made the process of collective drawing a powerful learning tool. By using existing skills and elements of language to investigate the problems they developed new understandings and new ways of using language (see Figure 38). By drawing on previous experiences and sharing these experiences, individuals develop a new perception through retelling. By exploring familiar places new eyes, they are challenging their own and others’ points of view.

Figure 37: The Process of Collective Drawing, Third-Year Studio, Rural Studio

Photograph: author’s own (2012).

Figure 38: Previous Collective Drawings, Rural Studio

Photograph: author’s own (2012).
At Rural Studio, students investigated the vernacular of the immediate area and used this experience to reinterpret a common feature of the built environment—the water tower. This was a familiar, everyday feature of the environment, but not necessarily one that was considered designed or significant. The act of sharing their understandings and telling and retelling their experiences created not only a collective drawing of a collective experience, but also served to develop a collective memory. These drawings formed part of the documentation for the project that is handed over to the next group of students at the beginning of the next semester. As such, the new students build on the collective documented experiences and understandings of the previous students to make their own meaning and form new understandings. When these abilities are explicitly required in learning experiences, students develop and strengthen their skills.

In architectural education, language expands to include a visual, architectural language. Students involved in the Firstlight Project were required to use multiple languages to meet the challenges they were set. The technical component of the project required a common understanding that was complex; however the project was also to be communicated to the public in language they would understand. The design brief and aesthetic developed by the student team responded to the specific environmental and cultural situations set as part of the Solar Decathlon Competition. Successful communication across multiple languages was demonstrated by the documentation of their learning processes. Cross-curricular teaching—the use of the same teaching space for different topic areas and the sharing of learning activities and outcomes through exhibition—demonstrated how multiple common languages could be learned and used.

Language itself can be dynamic. When a system of learning occupies or is integrated within a community over time a definable language develops that responds to and is understood by the broader community. The language of Rural Studio has evolved from a focus on the exploration of material (e.g., the student’s accommodation, the Butterfly House and Music Man’s house) to an architectural language more typical of the area (i.e., the 20K Homes). This evolution of language has emerged as a result of a deeper understanding of those living in these areas. Similarly, the language used by First Light Studio is based on the existing ‘eco-vernacular’; First Light Studio uses this known language to demonstrate the underlying principles of the architectural proposal. Exposure to this language and the skills required to become articulate in this language develop over time. Students’ repeated exposure to these languages in the contexts of their learning reinforces their skills. Additionally students are required to strengthen their languages and modes of communication through listening to others and talking about their decision-making processes.
7.2.3 Knowledge and Understanding to Contextualise Change

Design was defined by the theorists discussed in this thesis—Simon (1969), Alexander, Ishikawa and Silverstein (1977), and Schön (1983)—as a means of addressing a problem, suggesting that design is a process of response and control (i.e., response to an event, situation, or activity, and control of behaviour or change). However, the core skills that are integral to this response can be implicit, not explicit, in this process. The reading of architectural form and space can be intuitive when a common pattern language is employed (Alexander, Ishikawa, and Silverstein 1977). Reflection-in-action can take place as part of standard practice, without the explicit acknowledgment of the process (Schön 1983, 61). Knowing only the key properties or elements of a situation, and not the complex detail, can be enough to enable a common goal to be achieved. However transformation is more likely when the response is purposeful and meaningful, the contexts are clearly understood and the process of knowledge building is explicitly recognised and acknowledged. Critical reflection is one of the mechanisms through which this can occur. Reflection involves being in a state of uncertainty while existing worldviews are challenged and acting to uncover the facts that either confirm or contradict these worldviews (Dewey 1910, 9). The uncertainty created by these experiences can act as the catalyst for further reflection. Within the process of making sense of our place in the world, a continuity of the self through the past, present and future is established by reflection, which directs subsequent action (Boyd and Fales 1983, 106). The direction of the subsequent action can be observed in the transformation within learning, wherein individuals make sense of situations of uncertainty, allowing new understanding to be gained, and worldviews to be shifted.

This cycle of change is driven by the ability to contextualise change. Within a design process, learning experiences are provided to gain a fundamental understanding of the existing context—social, physical or natural. Through this understanding, something unexpected or surprising becomes apparent (e.g., a problem is identified or a goal is set to satisfy an unmet need. The evaluation of alternatives and consideration of consequences leads to recommended actions (Mora et al. 2005). This process, in which an existing understanding of the world is used to inform response to change within that world, develops the skills of understanding and action, which help individuals to make sense of future changes as they occur. The tacit norms that underpin judgements can be challenged and the strategies or theories implicit within certain behaviour can be examined. Reflection-in-practice, particularly when the process of design produces unintended consequences, can lead to new understandings as the designer responds to the new situations (Schön 1983, 61).
Change within dynamic systems is responsive and incremental. Change can be supported by providing experiences in alternative or different directions, creating an iterative process of acting, reflecting, continuing or retreating, and shifting direction. Embedding the designed response to change in its context supports ongoing change in the iterative existing system, rather than seeking to replace or substitute it. When all of those involved can participate in this contextualisation of change, a common understanding of the current context is reached. The elements that are to be challenged can be recognised through shared reflection and critical review. When this action occurs in small incremental steps, the barriers to change can be overcome. Once challenge and change has taken place, supporting new behaviour is critical for this change to become sustainable in the long term.

New behaviour must be supported as often learning systems are dynamic, and the contexts change. Environmental intelligence—the ability to be able to act on an understanding of how people relate to each other and environments—can be useful when seeking to understanding this constant change. At Rural Studio, the legacy left by previous students provides new students the opportunity to reflect on if and how their projects have been successful in meeting the goals set or the problems identified. This has resulted in a shift in focus over time from individual projects to a more collaboratively designed modular approach that can be applied to different situations repeatedly. At Victoria University of Wellington, the high profile of the Firstlight Project and its subsequent promotion has provided its own legacy (First Light Studio n.d.-a) as their design practice continues.

Learning systems are dynamic and change according to shifting worldviews, new people enter the system, new relationships are formed and new interactions take place. The nature of these changes must become known and the impact determined to enable those involved to respond to ongoing and continual change. The shared collective resources developed at Rural Studio expressed explicitly in publications and more tacitly in the built outcomes, enable new people—both students and staff— to review the change that has occurred. The interactions that occur through the new relationships can prompt reflection and inform subsequent change. In Victoria University of Wellington, it is the physical context that undergoes continual change, often due to growth and development, but also due to the seismic activity in the area and the impact this has on the built fabric. Immersion in this environment and familiarity with the dynamic context can make the differences discernible. Connections with other communities undergoing similar change can provide new perspectives on a familiar and shared situation. Through these connections, individuals can develop the skills, including adaptation and response, as are developed as new solutions to a common problem are explored.
7.3 Changing a System of Learning

Learning experiences can enable change to be positive, and have mutual benefit for all those involved. Reflection that challenges current worldviews and practices must be embedded within such experiences. A common language leads to shared understanding, and collaborative processes enabling the change itself to be contextualised and understood. The final critical element to transformative experiences in architectural learning is the cyclical nature of change. In this thesis, the definition of change is not limited to observable change in objects, such as architecture. This thesis focuses on the abstract nature of change: change occurs as a result of a process and the nature of change differs according to the system in which it occurred. Change within a system of learning is not a linear process; responses to change can prompt further change within the system. In this way, learning is recognised as an ongoing cyclical experience, not as a measurable outcome.

The framework discussed in this thesis recognises and identifies the elements of the learning system and the nature of learning experiences that can provide and support the opportunity for individuals as well as communities to change. It is structured not as a checklist or a set of rules, but as an organisational tool to identify the elements of experiences that prompt change in all levels of architectural learning. Through the methods of mapping and documentation discussed, change becomes more evident. However, in the case studies of architectural learning, the transformation that occurred, and the experiences that prompted, supported and sustained this change were often provided intuitively, arising out of the normal practices of already tacitly reflective individuals. Recognition of the core skills is often implicit within typical assessment strategies, particularly in assessments that are individually focused. The community that is often best served by the architectural program is the architectural education community itself, as it can be difficult to maintain long-term relationships with individual students whose time in the program is relatively short. However, this community can occur when teachers are defined as co-learners. Understanding learning as a process and making this process visible to others can broaden the influence of learning. When the broader community has access to the learning process, not only the learning outcomes, the influence of learning can be broadened.

The transformative experiences in architectural learning that support and sustain the climate-responsible design (a need identified in the Introduction to this thesis) can be integrated into existing architectural education programs and practices. Environmental and cultural knowledge is developed through critical reflection, meaningful communication and collaboration. The skills and knowledge developed can be applied to support professional and
personal practice in other dynamic systems that occur in professional networks, social communities and natural environments. People, staff, students and communities alike will become resilient by partaking in learning experiences that employ explicit approaches that respond to change. As the global mobility of professionals’ increases these learning experiences will support a sustainable universal design industry. Transformative designers, those who have learnt through a transformative experience and those who are capable of effecting transformation in others and in their environments, will be able to understand new situations and contexts and communicate their ideas and concepts in ways that are easily understood by others. Learning to be able to respond to the unknown future requires different skills and a flexible, but purposeful, positioning of worldview, so that the decisions that will be made will be of benefit for all.

The next chapter concludes this thesis, explaining how architectural learning can build the potential for those involved (i.e., students, staff and communities) to shift their worldview. Through transformative learning, environmental, technical and cultural knowledge is gained as core skills—critical thinking, communication and collaboration—are developed. When opportunities (i.e., the events that prompt, situations that support and activities that sustain change) can be integrated into architectural education programs, the development of these core skills becomes explicit and the resultant meaningful interactions lead to new relationships. The methods of documentation discussed in this thesis not only capture the development of these core skills and the subsequent transformation. These methods can be used by students, staff and communities to develop the ability to recognise the change in themselves as well as in others, and their environments.
CHAPTER 8: CONCLUSION

With a focus on transformative experiences in architectural learning this thesis posed three questions. First, how can transformative experiences in architectural learning prompt, support and sustain change towards responsible behaviour and sustainable development? This thesis has identified that architectural learning can strengthen the ability and capacity of those involved (i.e., students, staff and communities) to shift their worldview. In turn, designers may adopt design practices that contribute positively to changing environments. Second, what are the core skills designers must acquire to understand people’s needs, their environments and the relationship between them, and how do designers develop these skills? This thesis has identified that core skills—critical thinking, communication and collaboration—develop environmental, technical and cultural knowledge, which strengthens relationships through meaningful interactions. Third, can the development of these core skills be made explicit and more visible in architectural education? The methods of documentation discussed in this thesis not only capture the development of these skills, but also the impact of documenting the learning. As such, it is evident that opportunities can be integrated into programs so that those involved in architectural education—students, staff and communities—may develop the ability to recognise the change in themselves, others, and their environments. These opportunities include events that prompt, situations that support and activities that sustain change.

The thesis has explored how the relationship between people and the environments in which they live can be improved. In addition to the technologies that continue to emerge, sustainable development is recognised as a means of mitigating and adapting to climate change through responsible behaviour. Responsible behaviour is prompted by an individual’s understanding of their relationships with the environments in which they live. Climate-responsible designers must be able to ascertain the needs of individuals and communities, including their cultural and physical environments. It is this ability to understand the relationships that exist between these contexts that provides designers with the knowledge needed to create climate-responsible designs. This ability is typically developed through tertiary architectural education. A shift in the focus of architectural education towards transformative learning experiences can prompt a shift in the approach to design within the profession. When students acquire the necessary knowledge and understanding of people’s needs and their environments, the potential for future sustainable development is increased. The environmental and cultural knowledge gained supports stronger relationships between people and their environments. Skills of critical thinking, meaningful communication and collaboration improve resilience and support a positive response to change.
Designers develop their personal and professional points of view, which shape their ability to act responsibly, through formal architectural learning processes. Transformative learning develops the capacity of individuals to change their point of view, providing the catalyst for shifts in designers’ worldview. In doing so, designers refocus on the value of communities and the decisions that will provide long-term benefits. The nature of transformative experiences in architectural learning can be identified when there is an understanding of how development of skills and knowledge takes place and what can influence this process. These transformative experiences support the provision of climate-responsible architectural design, which provides both immediate and long-term benefit to individuals and communities.

In the introduction to this thesis, the reader is invited to examine the evidence discussed in part one, and represented in more detail in part two. It is intended that this examination prompts reflection on their own experiences and understanding of architectural education, and to consider how their practices may be transformed. Just as the research presented here has transformed my own practices and world, it is hoped that this new understanding of transformative experiences in architectural learning can prompt, support and sustain transformation in others.

8.1 The Nature of Transformative Experiences in Architectural Learning

Transformative learning has emerged as a way of adapting to change within a system of learning. Further, it ensures that the experiences within the system are meaningful. Transformative learning theory forms the foundation of this thesis’s discussion of the relationship between learning and a shift in worldview. The principles of systems theory have informed the methods used to document architectural education programs. Evidence of transformative experiences in architectural learning was collected using these documentation methods. Analysis of the evidence has led to the identification of the types of learning experiences that are most likely to prompt, support and sustain transformation. These experiences can be catalyst events that are uncommon, unusual or uncomfortable. They prompt individuals to challenge their assumptions and beliefs. Some experiences are situations in which a new or different worldview can be developed, as learning validates and consolidates the shift in values. Certain activities within these learning experiences sustain transformation. The knowledge and skills developed by and within the new worldview strengthen and are strengthened by the shift in position. The evidence from the selected architectural education programs at Massachusetts Institute of Technology, University College London, Delft University
of Technology, University of California, Harvard University and Southern California Institute of Architecture has been used to identify the kind of events that can prompt change, situations that support change and activities that sustain change.

Snapshots of experiences were collected from these architectural education programs. These snapshots provided insight into the nature of the architectural education on offer, including the different contexts and the type and roles of the people involved. Despite this, it was difficult to gain a deeper understanding of the relationships that occurred within the learning systems of these programs. The dynamic nature of the systems were difficult to define, and the action and interaction that took place during these experiences of architectural education is not often documented. However, the fieldwork undertaken for this thesis, particularly the time spent at the case studies and the analysis of the additional evidence enabled identification of the dimensions of learning experiences that have been added to the coding framework of transformative learning experiences.

From this framework, strategies have been developed that aim to integrate transformative experiences into existing architectural education programs and practices. Recognising the system of learning as dynamic highlighted an alternative way of looking at transformative experiences, wherein interactions change the system and the elements (i.e., the contexts and the people) within. As people took different roles and challenge themselves, their agency and capacity to change increased. When people from diverse social contexts were included, a broadened understanding of others and self-supported practice across a range of different experiences resulted. Those involved became resilient as they learnt to respond and adapt to change.

These transformative experiences enhance the development of the core skills of critical reflection, communication and collaboration. These skills provide individuals with the complex understanding that supports and sustains climate-responsible design. Those within the system of learning rely on a range of abilities and languages to develop new understanding through diverse modes of interaction. These abilities and interactions influence how experiences are shared and how different points of view inform the creation of a new meaning. Understanding architectural learning as a system can inform how the documentation of learning experiences can capture the development of core skills, the interactions that take place within the system, and the understanding of self and others that is gained. Developing the core skills requires the ability to understand situations and change, use common languages, and engage with diverse individuals and communities. These skills and knowledge contribute to a design process that is resilient and responsive.
8.2 Ways of Developing the Core Skills

Critical thinking, communication and collaboration have been identified in the thesis as the core skills required for the designer to develop necessary knowledge of people, environments and relationships. Theories of architectural education were examined to better understand the complex process of architectural learning and to identify how architects develop the knowledge and skills necessary for climate-responsible design. Learning about the nature of the environment, the needs of the clients and the potential impact of the design can be challenging for students. Designers must use these core skills to know the world in which they live, to understand how they view their world, and to make sense of their own and others’ experiences.

In this thesis, architectural learning has been framed as a dynamic system of contexts and people. Elements of this dynamic system interact in response to change and simultaneously, prompt change. Transformative architectural learning experiences are those in which individuals critically reflect on their values and beliefs, share experiences with others through meaningful communication, and use collaborative processes of design to challenge and shift personal worldviews. Transformative learning experiences require practices different to those that were documented in the selected architectural education programs. Framing architectural learning in this way has broadened the scope of the analysis of architectural education and understanding of transformation discussed in this thesis.

8.3 Ways of Recognising Architectural Learning and Transformation

It is difficult to identify where the core skills are explicitly developed within architectural education. Typical assessment criteria for architectural education do not explicitly recognise these core skills; although demonstration of the resultant understanding is often required. While the different contexts for learning, (e.g. built, natural and social) are typically recognised, the impact of transformative experiences upon these contexts is not. Alternative methods of examining architectural education use criteria of analysis different to those currently used to examine architectural education programs. The methods discussed in this thesis surpass the traditional approaches of benchmarking, global ranking and accreditation. Methods of mapping were used to document the different contexts in which learning occurs. The roles and types of diverse people engaged in this learning were recorded through narratives recounted through interviews. Observation of learning activities captured the contribution made by different modes of interactions to shift the worldview of those involved.
The multiple contexts of learning and the diverse abilities of those participating in architectural education programs were made explicit by using these different methods of recording learning experiences. Consequently, the nature of learning experiences could be examined. How known-world experiences of learning can be shared and understood in different ways was explored. The contexts of learning were mapped through the purposeful and critical reflection of the situations. The identification of the characteristics of the contexts foregrounded the ways in which these contexts related to each other. The method of modelling worldviews, an example of how learning experiences are shared, was a means of understanding the relationships between people and the interactions that occur between people and the contexts of learning. Interactions between people prompt and support a shift in epistemological position and worldview. The roles of individuals and modes of interaction within architectural learning were identified through the documentation of observation of behaviour. Analysis of this documentation made the cognitive processes and modes of learning explicit. In doing so, change in the contexts, the people and the interactions within systems of architectural learning were captured.

Each of these methods requires a unique mode of analysis. The contexts of architectural learning were defined using reflective analysis of maps and photographs. The worldviews of individual were modelled through narrative analysis of interviews. Acquired immersion enabled observations of interactions within the system of architectural learning, which were analysed to determine how and where the core skills of critical reflection, communication and collaboration were developed. The findings from the analysis of the evidence was organised and coded to define the characteristics of transformative experiences in architectural learning. The framework that emerged from this coding defined the nature of transformative experiences in architectural learning.

Changes in the different elements of the learning system became apparent at different times when learning processes, rather than learning outcomes, were prioritised. The nature of this transformation was recognised within individuals and the learning system. Those involved demonstrated individual change immediately. Local change became evident over the intermediate time frame. Long-term change occurred at an organisational level. Changes in the people within the system, and in the system itself, were seen to prompt and support further change.

Such transformative experiences in architectural learning are more likely than conventional learning methods to support the development of core skills of critical thinking, communication and collaboration and thus, promote climate-responsible design. Transformative experiences in architectural learning enable designers to think critically about
their experiences and to set goals in collaboration with others in response to situations that arise. A common language is developed collectively with all stakeholders, by communicating ideas and concepts in ways that are easily understood by others from new and unfamiliar contexts. The change that occurs within a dynamic system can be contextualised and understood through reflection and the sharing of experiences.

If the agency to change exists, experiences such as goal setting activities and using effective communication and a common language to share experiences can also sustain a change in practice. This agency arises from opportunities to develop the ability and build the capacity for change. Embedding key learning strategies into architectural education—such as goal setting, collectively developing a common language, and contextualisation of change—can enable those involved to develop the ability to respond to changes in the future. This will support a flexible, but purposeful, positioning of worldview that engenders decisions that are of mutual benefit. The skills and knowledge developed can be applied to support professional and personal practice in different dynamic situations. Individuals become resilient and responsive in learning experiences that require creative approaches.

The findings of this thesis can be considered from three points of view. For those seeking to understand the complex process of architectural education, the methods of documenting a system of learning can be used to identify strengths and recognise opportunities within an existing architectural program. For those seeking to develop architectural education programs, understanding the nature of transformative experiences will help to create learning events that prompt, situations that support, and activities that sustain change. Strategies have been outlined that support the development of the core skills required. It is important that these core skills are made explicit within architectural education programs. For those involved in school environmental education and professional development activities, these strategies could be integrated into existing programs. As the global mobility of professionals’ increases these learning experiences will support a sustainable universal design industry. Designers will be able to understand new situations and contexts, and communicate their ideas and concepts in ways that are easily understood by others who are unfamiliar with these processes. Learning to be able to respond to the unknown future world requires different skills and a flexible worldview to ensure that the design decisions will benefit all.
REFERENCES


SUSTAINING LEARNING


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Sustaining Learning: Transformative Experiences in Architectural Education

PART TWO: Appendices

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This thesis is presented for the degree of Doctor of Philosophy of The University of Western Australia
School of Design
Architecture
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# LIST OF ABBREVIATIONS

<table>
<thead>
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<th>Abbreviation</th>
<th>Full Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACA</td>
<td>Architects Accreditation Council of Australia</td>
</tr>
<tr>
<td>AIA</td>
<td>Australian Institute of Architects</td>
</tr>
<tr>
<td>CADC</td>
<td>College of Architecture, Design and Construction</td>
</tr>
<tr>
<td>CED</td>
<td>College of Environmental Design</td>
</tr>
<tr>
<td>FAD</td>
<td>Faculty of Architecture and Design</td>
</tr>
<tr>
<td>GSD</td>
<td>Graduate School of Design</td>
</tr>
<tr>
<td>UIA</td>
<td>International Union of Architects</td>
</tr>
<tr>
<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>RIBA</td>
<td>Royal Institute of British Architects</td>
</tr>
<tr>
<td>SCI-Arc</td>
<td>Southern California Institute of Architecture</td>
</tr>
<tr>
<td>TU Delft</td>
<td>Delft University of Technology</td>
</tr>
<tr>
<td>UIA</td>
<td>International Union of Architects</td>
</tr>
<tr>
<td>UCL</td>
<td>University College London</td>
</tr>
<tr>
<td>UCLA</td>
<td>Berkeley University of California, Los Angeles</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>VUW</td>
<td>Victoria University of Wellington</td>
</tr>
</tbody>
</table>
APPENDIX A: THE COMPLEX PROCESS OF ARCHITECTURAL EDUCATION

Appendix A focuses on describing the complex process of architectural education and places architectural education within a theoretical context, in which the roles of knowledge and learning are explored. This appendix provides a background of current architectural education to support the argument within accompanying thesis: transformative experiences in architectural learning can prompt, support and sustain positive change in our built environments, mitigating the negative impact on natural and social environments. The thesis explores the role of knowledge and world view, and how learning—as opposed to education—contributes to an individual’s understanding of their world. Additionally, this thesis explores how an individual’s epistemological position can change as a result of their learning experiences. More specifically, this thesis investigates how a student’s position on architecture, its role with the world, and how architecture is known, can change as a result of learning. To understand the role of architectural learning and knowledge, the epistemological positions that underpin the learning experience must be acknowledged. The nature of learning and teaching practices in architectural education can vary. An understanding of different learning theories and recognition of the different ways in which individuals learn has informed the exploration of the complex process of architectural education presented in the accompanying thesis.

Section A.1 of this appendix outlines the role of the different epistemological positions adopted by architectural education programs. Learning is discussed in relation to the ways in which knowledge building is supported by how we place ourselves in the known world, and how we act in this world. This model of world views informed the discussion of how world views can change (see Chapter 2). Section A.2 of this appendix describes how the different skills, abilities and processes of learning affect how an individual learns. This understanding of learning and ability can be embedded in learning experiences to empower students and influence their development (see Chapter 3). Section A.3 of this appendix outlines the review of publications that directed the documentation of the selected case studies (see Chapter 4), informed the development of the coding framework (see Chapters 4 and 5) and the transformation for architectural learning (see Chapters 6 and 7). The observations regarding current practices in architectural education are derived from my professional experiences of teaching in one program for over 10 years, as well as the insights I have gained through my visits to several architectural education programs in Australia. Additionally, these descriptions have been informed by the research of Dave (2004), Ostwald and Williams (2008), Buchanan (2012) and Salama (2012).
A.1 Epistemological Positioning, World View and Architectural Education

An epistemological position refers to individuals’ knowledge about the world, and how this knowledge develops (Kolb 1984, 37). However, architectural education programs are not often considered in this way. While epistemological positioning may be explored as part of the curriculum, it is not explicit in discussions about how architectural education occurs. When examining architectural education programs, acknowledging their epistemological positioning can elucidate how students within these programs develop their architectural knowledge and how their underpinning assumptions about their world are formed.

A positivistic position is taken within an architectural education program when architectural knowledge is gained through the understanding of facts that are common to all. A clear set of rules that governs actions and behaviours is presented as a way of understanding and creating architecture. The knowledge underpinning these rules is objective. In the technical and environmental subject areas, information is delivered based on facts, occurrences, and actions that can be measured and applied (e.g., the performance of different materials or construction systems in defined circumstances). Within other subject areas (e.g., history and theory, or design studies), architectural projects and built outcomes that respond to certain situations are presented as known facts. These projects are analysed and the resultant understanding can be applied to new situations. Within this study, this approach to learning is defined as positivistic. When a teacher presents the information, and students explore problems within a given context, certain measurable outcomes are achieved and assessed. While the students build up their skills and knowledge, the learning is not structured to challenge or shift their world view, but rather to confirm and support their existing position (Karol and Mackintosh 2011).

An interpretivist position involves making meaning through experiences and understanding the world through the analysis of experience. Design–build programs are often understood through an interpretivist lens. In addition to the learning activities, students analyse and synthesise their learning experiences by focusing on the relationships and interaction of the stakeholders (i.e., students, staff and communities) and sharing their experiences (Phillips and Mackintosh 2017, 6). This learning process leads to understanding that is socially constructed and contextualised. The process changes over time as reflection leads to adaptation in response to context.

Heath (2010, Chapter 1) defined two disparate positions of architectural education as ‘architecture as problem solving’ and ‘architecture as creative exploration’. Table 1 summarises these positions, aligning each with an epistemological position, learning theory
and type of learning experience. This summary has been useful in this thesis as it has informed the development of the methods used to document architectural education programs (see Chapter 4).

Table 1: Two Positions on Architectural Education

<table>
<thead>
<tr>
<th>Epistemological Position</th>
<th>Learning Theory</th>
<th>Learning Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture as Creative Exploration</td>
<td>Interpretivism: knowledge is subjective and contextualised; common understanding is socially constructed.</td>
<td>Knowledge building through experience focuses on meaningful processes.</td>
</tr>
<tr>
<td>Architecture as Problem Solving</td>
<td>Positivism: theory is tested against common rules. Observable universal facts govern actions and outcomes.</td>
<td>Knowledge building and skill development focuses on competency-based outcomes.</td>
</tr>
</tbody>
</table>

Source: author’s own (2015) adapted from (Heath 2010, Chapter 1).

Understanding the epistemological positioning of an architectural education program is a way of understanding the learning within these programs. As discussed in Chapter 2, world views are informed by learning. The values and beliefs of the self-world that are developed throughout the learning process can influence actions and decisions within the design process. When there are opposing world views, it can create confusion for both staff and students. As such, conflicting assumptions about the nature of knowledge and meaning can result (Kolb 1984, 29). However, acknowledging this confusion and resolving the conflict can prompt a shift in world view.

Atkin (1999) used Holt’s (1974, 20) model of the worlds we live in to explain the different ways in which knowledge is built through learning and how this learning can change values (see Figure 1). The innermost world is the world in which the understanding of self, values and beliefs occurs. These values and beliefs informs individuals’ decisions and actions. In this thesis, the innermost world is referred to as the ‘self-world’. The second world is physically and personally experienced (i.e., known directly). This thesis defines the second world as the ‘known world’. The third world is the world that we know of or know something about, but have not known directly or experienced. This world is understood through the experiences of others. This thesis refers to the third world as the ‘known-of’ world. The fourth, outermost world comprises all possibilities that have not been imagined yet. This is a world that can be difficult to understand and know, but it can inform and be informed by knowledge in the other worlds. This world is referred to as the ‘future world’.
This thesis adapts this model of world view to explore the relationship between the learning experience to meaning making, knowledge building, understanding, and change. The worlds are renamed, emphasis is placed according to how knowledge is gained and the boundaries between the worlds are shown differently (see Figure 2). An individual’s knowledge of the known-of world is emphasised when a positivist position is taken (see Figure 2, left). Conversely, an individual’s knowledge of the known world is emphasised when an interpretivist position is taken (see Figure 2, right). The relative size of the known- and known-of worlds in these diagrams reflect this emphasis. The lines between these segments vary in thickness to indicate the difference in strength of the boundaries between these worlds.
understanding and meaning expands by sharing direct experiences through effective communication (see Figure 3, left). When the methods of communication limit awareness of the other worlds, impermeable thresholds can impede individuals’ development, as the understanding of one world is less likely to be influenced by that of another (see Figure 3, right). When the learning experiences are tightly focused on one position, the boundaries between these worlds are strengthened and become impermeable. However, transformative learning experiences can counter this rigidity, as sharing knowledge and experiences can shift an individual’s world view.

![Figure 3: Permeable (left) and Impermeable (right) Boundaries](source: author's own (2015))

Experiences are shared by reading and listening to others’ views. Consequently, an understanding of known-of world is developed. When experiences are shared in a meaningful and engaging way, direct action is prompted. As such, knowledge of a known-of world becomes an understanding of the known world. The meaning that is made from direct experience (i.e., the knowledge that is gained), influences and informs the understanding, values and beliefs of the self-world. Atkin (1999) acknowledged the difference between knowing of and knowing, and recognised the importance of balancing experiences of and in both. Our understanding of the world, and the events and situations that occur within it, shapes the values and attitudes that direct our decision-making, which influences our behaviour and actions. Therefore, behaviour—the actions and activities that occur in response to a specific situation (Williams 1983, 44)—are informed by what we know. If what we know is developed through learning, then we must consider how ideas and beliefs can be changed through learning.
A.2 Learning Theory and Architectural Education

The nature of learning varies according to epistemological positions and as such, there are different theories offered on the types of learning. Following the emergence of psychology as a discipline independent from biology and philosophy, learning theory has become a specific field of inquiry (Ashworth et al. 2004). Ashworth et al. (2004, 2) defined the five key orientations of learning: behaviourist, humanist, cognitivist, social learning and constructivist. These theories are discussed in this appendix in order. The instances in which these types of learning may be found in architectural education programs is also discussed. This discussion is not offered as a comprehensive list of theories, but rather as an overview. The purpose of this discussion is to illustrate where these different types of learning may be found within architectural education programs and identify how epistemological positioning may influence the learning experiences with each of the selected architectural education programs studied (see Appendix C).

Behaviourism places an emphasis on the connection between an environment and behaviour. The connections—or ideas—are considered constant in given situations and are typically provided by teachers. In architectural education, this environment is often the design studio, and the corresponding behaviour is demonstrated by visual communication methods. Architecture students are instructed on the use of specific communication techniques to solve given problems. Various combinations and associations of ideas form certain patterns of thought and in turn, lead to certain actions. Learning is evidenced by a change in ability; outcomes are used to measure how many fixed ideas someone has learned. If a consistent learning experience is provided for all, certain competencies and skills are developed and known learning outcomes are clearly and consistently demonstrated. A student’s ability to visually communicate is assessed in terms of how successfully the techniques are used to convey ideas and concepts. This positivistic approach is often successful in learning languages (i.e., visual architectural language). The connections made between language and meaning relate to an understanding of the known-of world and are often universally understood. Students may be required to apply these methods to subsequent problems presented throughout the program and across different subject areas. This approach, while successful in developing a discipline-specific language, may limit the students’ ability to meaningfully communicate with those outside the discipline—especially those who may not be familiar with the discipline-specific language and its meaning.

Cognitive learning theory, a development of behaviourist theory, recognises that associations and patterns of thought can be formed through contiguous and repetitious
events. In architectural education programs, students are repeatedly required to complete design projects. Known associations are learned objectively, and are corrected, strengthened and improved through feedback provided by teachers and peers in response to experience and performance. By repeatedly undergoing the design process, students develop a design approach that can be adapted to different projects and circumstances. Further, there is the opportunity for their understanding of the known-of world to be transferred to the known world. Thus, the positivistic approach of behaviourism is adapted to accommodate the influence of students’ personal experiences. This approach relies on architecture students’ ability to think critically about the problem presented, to reflect on their progress and make changes as required.

Social Learning theory encompasses a wide range of theories and approaches, but two main positions have emerged. Aligned with the positivist approach of behaviourism, one position considers the individual as passive and their behaviour as directed by attitudes and values of their social environment (i.e., the social norms established by stimulus and response). The other, active learning theory or humanism, focuses on how individuals acquire attitudes and values through social interaction. In formal learning situations, the individual is self-directed, with the teacher facilitating understanding through guidance and discussion. The informal learning process is one in which the learner and the social environment are both active and have mutual influence. In architectural education programs, students are required to exhibit and present their work. As students draw, write and talk about their work with their peers and teachers, the interaction encourages students to discuss the decisions they made, consolidating their position on architecture and design. The common language and experiences of designing enables the point of view of other architecture students to be understood. Personal values and attitudes are shaped through social experience and responses. The skills developed relate directly to the social situations in which the learning experience takes place. Learning outcomes of individuals within a given social situation can be compared; however, different situations lead to different outcomes, making consistent comparison of learning difficult. This subjectivity can be difficult for architectural students to navigate; however, as they are exposed to other points of view, they are given opportunities to develop critical thinking skills that are necessary to resolve differences and conflict.

Constructivism also connects learning and action as a process of meaning making. It aligns more closely with an interpretivist position as the process requires the critical development of concepts. Experience, observations, and actions are integrated as the learner interacts with experience and environment to construct knowledge (Kolb 1984, 52). In architectural education programs, students are encouraged to interrogate their own
experiences in the built and other environments to understand the meaning they make from these environments. The teacher guides the process in formal learning activities or informally through reflection of everyday experiences. The skills of communication and reflection extend beyond the discipline of architecture when diverse environments are considered. Successfully developing this understanding expands the architecture students’ known world, as they come to understand the known world of others. This theory focuses on the learning process, rather than learning outcomes. As such, the measures of learning (i.e., assessment) are adjusted to suit. The development of skills varies between individuals, as the same situations are interpreted differently. In architectural education programs, this is evident in the final-year capstone projects, wherein students identify their topic, direct their research, and define the outcomes to be reached. Typically, these projects assess students’ ability to research, think critically, and communicate to a broader audience.

The different capacities and abilities of students influence their learning experiences and the ways in which meaning is made. These abilities are part of the mechanism by which the world is understood. Meaning made by processing information received through experience or transfer of information is different for individuals. Knowledge transfer relies on certain capacities, abilities, different formats and modes of knowledge. Limited ability can impede the capacity to understand and make meaning of a certain event or situation. As such, it is important to recognise the different abilities that can influence the development of knowledge, to empower students and optimise their learning.

**A.2.1 Differing Skills and Abilities**

Gardner (1993) proposed that individuals possess varying abilities in a range of modalities. Gardner’s Theory of Intelligence defined eight modalities rather than a single intelligence. Of these eight modalities (i.e., intelligences), the following are considered relevant to architectural education programs. Linguistic intelligence relates to sensitivity to spoken and written languages, the ability to learn languages, and the capacity to use language for self-expression. In architectural education, students use multiple languages (e.g., visual, spoken, written and drawn) to both communicate to and understand others. A high mathematical intelligence is the ability to analyse problems logically, detect patterns, and reason deductively. Architecture students are expected to think critically about the situations and problems presented. Personal intelligence—the ability to understand others (i.e., interpersonal intelligence) and the ability to understand self (i.e., intrapersonal intelligence)—is useful in collaborative problem-solving activities (Gardner 1993, 22-26).
The recognition of multiple intelligences prompted further consideration of the abilities that influence learning, such as the theory of emotional intelligence (Mayer et al. 2012). Emotional intelligence relates to the ability to understand feelings associated with certain situations and actions. It refers to the ability to read emotions in faces, music, designs, and stories. This ability is important in architectural education wherein high levels of collaboration and interaction are required for interpretivist learning experiences. The creation of space relies on an understanding of others’ emotions. The ability to control stakeholder interactions through the manipulation of situations and environments is important in architectural education programs. Climate-responsible designers read situations and experiences to design engaging and sustainable architecture.

In an increasingly urbanised world, the ability to know and understand built and natural environments is relevant. Spatial intelligence is the ability to visualise objects in space with the mind’s eye and to imagine how objects may appear as they move in space, or as the viewer moves about the object (Newcombe and Frick 2010). Van Schaik (2008) argued that spatial intelligence is influential in the creation of better relationships between internal and external environments. Naturalist intelligence relates to the capacity to recognise, categorise and draw upon certain features of the environments by observing, understanding and organising patterns in the natural environment (Gardner 1999, 48-52). Environmental literacy, defined as ‘understanding and appreciating the natural world, and our place in it’ (Environmental Literacy Council 2008) refers an understanding of the natural environments in which architecture is placed.

Sternberg’s (1985) Triarchic Theory of Intelligence recognised human intelligence as the ability of an individual to deal with change in their environments. The three parts to Sternberg’s theory are componential (i.e., an ability to take apart problems and see solutions not easily found), experiential (i.e., a creative ability to perform an unfamiliar task), and practical or contextual (i.e., the mental ability to create a fit between self and the environment). These abilities enable an individual to generate new ideas and solve new problems in response to changing environments. Practical intelligence has been developed further by Wagner (2012) as domain knowledge (i.e., the ability to adapt to change, shape responses, and select outcomes). This way of understanding supports the application of formal learning to everyday (i.e., familiar and repeated) situations.

In architectural education programs, language ability (i.e., the ability to communicate) and literacy (i.e., the ability to send and receive information and make sense of it) are core skills. Illiteracy limits knowledge to information found in the known world of self and real, wherein direct experience is the primary source of knowledge. Communication skills support
the meaningful sharing of the known-of world of others. Limitations in language ability mean that personal knowledge, ideas and information cannot be shared with others, as individuals cannot communicate effectively or understand what it is being communicated. Interaction (i.e., the direct communication between people) relies on individuals’ or groups’ abilities in multiple languages. Additionally, the meanings of the languages must be shared by all involved. The visual language typically used to share architectural ideas and experiences is considered a discipline-specific language and skills in this language are developed in architectural education programs.

The focused curricula of architectural education programs develop individuals’ skills in multiple languages; however, environmental literacy is not explicit in these programs. Environmental literacy has many definitions. The OECD (Organisation for Economic Co-operation and Development 2012) defines environmental literacy as being ‘able to identify, explain and apply scientific concepts related to a variety of environmental topics’. An environmentally literate student is able to make informed decisions about the environment; they act successfully in daily life because of their broad understanding of how people and societies relate to each other and to natural systems, and how they might do so sustainably (Maryland Association for Environmental and Outdoor Education n.d.). The Victorian Association for Environmental Education (n.d.) defines environmental literacy as ‘the capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore or improve the health of those systems’. It is the latter that is considered in this thesis as critical to climate-responsible design.

In this thesis, evidence of these abilities—beyond the academic skills and abilities expected—is examined within the examples of best practice of architectural education (see Appendix B for methods and Appendix C for documentation). Emotional, spatial, practical and social (i.e., personal) intelligence are recognised as abilities that support learning in architectural education. These abilities support individuals’ understanding of self and others, as well as objects and spaces. Ability in the multiple languages used in architecture (i.e., written, spoken, visual and environmental) supports meaningful engagement with the diverse contexts of architecture. Mathematical or logical intelligence (i.e., numeracy or quantitative literacy) supports the process of architectural learning, as a means of developing a logical understanding of a situation and communicating this understanding to others. These abilities, languages and literacies are not consistently recognised in the curricula of architectural programs, and are often not targeted during the learning process.
A.2.2 Learning Outcomes and Processes

Assessment is the tool most commonly used as evidence of learning, knowledge building and development of skills. The careful design of assessment tasks ensures that the defined learning outcomes for the program and its components are demonstrated. Such assessments often assess the ability of the individual student to demonstrate skills, or depth of understanding. Some assessments incorporate group work, in which students share their thoughts and insights and collaborate to solve a set problem, or reach a point of resolution. This can be observed across all subject areas in architectural education.

Different abilities can be accommodated by considering the process of learning, as well as the outcomes. In architectural education programs, the process of learning is made visible by displaying or exhibiting the outcomes or conducting learning activities in common areas. The design studio also provides the environment for these types of activities. In other core subject areas, the progress of learning is made visible in other ways and visible outcomes are used to support critical reflection and peer review. The recording and documentation of the stages that an individual or group have achieved can be shared as they happen. Architectural students are often required to keep journals, in which they reflect on progress and the design process. Progress made visible at key points or milestones can prompt reflection, critical analysis and sharing of skills and knowledge. The focus of these visible outcomes is considered either professional (i.e., focused on architectural projects and the application of theory) or academic (i.e., the development and discussion of architectural theory and knowledge). These outcomes are made visible through exhibitions, publications and events such as public lectures, symposiums and conferences.

This approach to understanding the complex process of architectural education broadens the view taken of the context of architectural education, and has led to the development of a system framework of learning (see Chapter 3). A review of recent publications was conducted to direct the documentation of the selected case studies (see Chapter 4), inform the development of the coding framework (see Chapter 5) and shape the recommended strategies for architectural learning (see Chapter 7).

A.3 A Review of Publications

In 2015 I undertook a review of publications from the last 25 years that related to architecture and education. Using the Informit databases, I focused on the keywords ‘education’ in the architecture database, and ‘architectural education’ and ‘transformative and learning’ in the education database. The search for ‘education’ in the architecture database
resulted in 866 results. Of these publications, approximately 60 per cent discussed architecture awards and education buildings (i.e., schools and universities), without reference to educational programs. These articles and papers were reviewed to determine their content, but not included in the subsequent analysis. The remaining 332 publications were reviewed.

The search for keywords ‘architectural education’ in the education database resulted in 202 results. The search for keywords ‘transformative and learning’ in the education database resulted in 265 results. A search for ‘transform’ in the architectural education Informit database produced two results related to change in a built environment; however, they were unrelated to the learning. These articles were not included in this review. The ‘architectural education’ search in the education database was refined, and the search for ‘chang*’ produced 13 results related to change in work environments (one article), change in technology (one article), change in teaching (one article) change in curriculum/education (seven articles), and change in practice (three articles). These articles were also not included in this review. The outlines and summaries of the publications listed in the searches were reviewed to determine trends in themes, methodology and focus.

The theme of the articles and papers was determined by identifying the main subject of the discussion. The themes identified included discipline-specific knowledge and skills, the design of the built environment, descriptions of the learning experience, discussion of the learning outcomes, and pedagogical practices. In the publications reviewed, it became apparent that different approaches (i.e., the methods employed by the author to gain their understanding of the focus of the research) were undertaken by researchers. The methods used included case studies, differing methods of analyses, and theoretical discussions. Literature review was another method that was used in some of the publications, but the results were not significant. Of the 744 publications reviewed, one publication in the ‘architectural education’ search and 11 publications in the transformative learning search were identified as using literature review as the methodology in their summary.

The publications were reviewed to identify whether the authors focused on the process of architectural education as discussed in Chapters 2 and 3 of the accompanying thesis. It was noted whether the literature discussed the epistemology of the program and abilities of the students, acknowledged the elements of the transformative learning system (i.e., the contexts and people) and their interaction, and identified the relationships between people and context. This review assessed for reference to the multiple languages used in architectural education programs and discussions relating to the way in which interactions took place between people (i.e., staff, students and communities) or between the different contexts (i.e., the built, natural, social and educational). Evidence of a relationship taking place
between the different contexts was noted when the influence and effect of education programs (i.e., the learning process or the learning outcomes) were mentioned. Finally, it was noted whether the author mentioned change in the people involved in the architectural education programs discussed. Table 2 summarises the parameters of this review.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discipline knowledge</td>
<td>This relates to the relevancy to practice, discipline-specific knowledge and skills, and assumed knowledge.</td>
</tr>
<tr>
<td>Design</td>
<td>This discussion relates to the design of the built environment, typically schools and other learning spaces.</td>
</tr>
<tr>
<td>Contexts of learning</td>
<td>The nature of the context is typically educational or built; however social and environmental contexts are also discussed. The social context includes a specific person, or group of people.</td>
</tr>
<tr>
<td>Learning experience</td>
<td>The learning experiences mentioned are usually those of the students.</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>Artefacts are produced as outputs of the learning activities.</td>
</tr>
<tr>
<td>Pedagogical practice</td>
<td>Pedagogical practices vary and include design–build programs and activities.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case study</td>
<td>Case studies typically focus on a specific situation, location, event or group of people.</td>
</tr>
<tr>
<td>Methods</td>
<td>The methods discussed include exploring, investigating and communicating architecture through education and research.</td>
</tr>
<tr>
<td>Theory</td>
<td>Theory is used to ground the research and provide background.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Focus</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilities</td>
<td>The researcher acknowledges skill level, acquisition of skills and knowledge, application of skills to projects and learning outcomes.</td>
</tr>
<tr>
<td>Epistemology</td>
<td>This discussion relates to foundations of theory, and positions on ethics, values, principles and beliefs at a personal, professional and educational or system level.</td>
</tr>
<tr>
<td>Interaction (people)</td>
<td>Interaction includes those between staff, students, community, profession, and clients. Modes of interaction include communicating, sharing experiences, and mentoring.</td>
</tr>
<tr>
<td>Interaction (contexts)</td>
<td>Interactions between contexts includes learning in diverse social contexts and the way in which the built environments shape learning. The social context refers also to professional communities, beyond the educational context. The educational context includes the institutional context. No distinction is made between on–campus or online learning activities.</td>
</tr>
<tr>
<td>Interaction (people and contexts)</td>
<td>The discussion includes activities wherein students direct their own learning, the community contributes to the learning, students actively build architecture and visit sites as authentic learning experiences.</td>
</tr>
<tr>
<td>Relations (educational and built)</td>
<td>The influence of education on the built environment (i.e., changes in professional activity and the built fabric) is discussed.</td>
</tr>
<tr>
<td>Relations (educational and social)</td>
<td>The influence of the curriculum on society, communities, and profession (i.e., the value, function and impact of architecture) is discussed.</td>
</tr>
<tr>
<td>Relations (educational and natural)</td>
<td>The influence of the curriculum on the natural environment (i.e., has learning resulted in a change in natural environment) and recognition of the role of the natural environment in education.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change in People</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>A change in the environment (built and/or natural) is related to the learning activities.</td>
</tr>
<tr>
<td>Students</td>
<td>The students demonstrated a change in world view, values and behaviour as a result of the learning activities.</td>
</tr>
<tr>
<td>Staff</td>
<td>The researchers mention a change in staff world view as a result of the learning activities.</td>
</tr>
<tr>
<td>System</td>
<td>The learning activities have led to or influenced institutional or organisational change.</td>
</tr>
<tr>
<td>Practice</td>
<td>A change in teaching and learning practices is the result of the learning activities.</td>
</tr>
</tbody>
</table>

This review of publications highlighted the differences between architectural research that focuses on education, and education research that focuses on architectural education. For each of the searches, the dominant approach and focus was identified for the themes that were more commonly discussed in the publications reviewed. Within the architectural research that focuses on education (see Figure 4) common areas of focus included the educational context, the interaction between the built and educational contexts, and the demonstration of discipline-specific skills and abilities. However, while knowledge and how others make meaning within the built environment are discussed, the role of world view and the epistemological positioning of the architectural educational program itself were not often explicitly addressed. Education research that focuses on architectural education (see Figure 5) discussed the relationship between two contexts (e.g., the role of the built environment in education), a specific interaction (i.e., an event or learning activity, such as the design studio) or a particular component of the curriculum (i.e., technology). Within the education research that focused on transformative learning (see Figure 6), there was no mention of architecture-specific education, and the discussions centred around pedagogical practices in general. The publications focused on the epistemological positioning of the learning activity, the interaction between the people involved and the relationship between the educational and social contexts of the learning.

While it is the extent of change that is often discussed within the architectural and educational literature reviewed, the nature of the change remains centred on students, the educational and built contexts and the education systems itself. Within educational research into transformative learning, the transformation most often discussed is that of the students. While the changes to the system, organisation or institution are mentioned, it is mostly limited to the educational context only. Within architectural education research, when discussing learning outcomes, the primary focus is change to the environment, as evidenced by the skills demonstrated by the students. This is typical of the outcome-focused approach to architectural education. In one-quarter of the items reviewed, changes in professional practice were most often discussed within the theme of the role of education. However, as discussed in Chapter 2, there have been minimal changes in practice. The changes in practice that are discussed in the literature often refer to the relationship between the person (typically the student) and the contexts (usually the built context). While not explicitly stated, this is understood to be evidence of changes in skills and abilities, rather than epistemological change. Changes within the system, typically the institutional system, were discussed in around one-third of the items reviewed, wherein the contexts of the learning were the focus. These discussions were limited to changes in the educational and built contexts.
Figure 4: Architectural Research Focused on Education

Figure 5: Education Research Focused on Architectural Education

Figure 6: Education Research Focused on Transformative Learning

In the publications reviewed, the case studies are the primary method of research. These case studies are typically focused on architectural educational or transformative learning. Researchers have used these case studies to explore the application of a theory in practice, undertake inductive research through theory testing, describe a specific situation or experience, and assess the learning outcomes resulting from a certain experience or teaching approach. The use of a case study approach within this study accounted for systems of learning, provided evidence of situations and phenomena in multiple contexts, and documented the actions of the three social groups (i.e., teachers, students and community) within the contexts of the learning.

As discussed in the Introduction of the thesis, a distinction has been made between architectural education and learning. This discussion of epistemology, abilities, process and outcomes of architectural education programs has shifted the focus of the study to the experience of architectural learning. The broader situation in which these experiences take place is acknowledged through the development of a framework for architectural learning that provides an alternative way of understanding architectural education. The methods of measuring architectural education (discussed in Chapter 4) acknowledge the learning process and outcomes, identify the professional or academic focus of the learning, and record individual or group assessment. Appendix B explores how these different learning theories and abilities can be used to understand the complex process of architectural education. The discussion in Section B.1 includes the development of the methods used to document the selected architectural education programs. The coding framework used to identify the transformative experiences in the case studies of architectural learning is described in Section B.2.
APPENDIX B: DOCUMENTING ARCHITECTURAL EDUCATION

This appendix focuses on ways to account for and measure the complex process of architectural education and the different methods used to document architectural education programs. This appendix provides a description of the process in which the researcher developed methods of documentation, and the organisation, coding and analysis of evidence. This description demonstrates how architectural education programs and transformative experiences in architectural learning can be found and documented. The view taken of architectural education in the accompanying thesis is broad, and the documentation methods of mapping and diagramming look beyond curricula and learning outcomes. The methods include the techniques used to map the multiple contexts of the system, the data collection methods used to define the types and roles of people and the measurement of the interaction between those participating within the architectural programs. Additionally, the methods used to determine the epistemological positioning of the selected architectural programs and identifying the assumed skills and abilities expected of students within these programs were discussed. Finally, the ways in which the visible learning processes are documented was described. These methods are presented in the accompanying thesis as an alternative way of assessing and evaluating architectural education programs.

Section B.1 of this appendix describes the different methods used to document each element of the selected architectural education programs. These methods include the techniques used to map the multiple contexts of the system, the measurement of the interaction between those participating within the educational, and the data collection methods used to define the types and roles of people. Additionally, the methods of determining the epistemological positioning of the selected architectural programs and identifying the assumed skills and abilities expected of students within these programs are discussed. Finally, the ways in which the visible learning processes are documented is described. These methods are presented as an alternative way of assessing and evaluating the architectural education programs.

Section B.2 of this appendix describes the additional methods of documentation and analysis required to account for the transformative experiences in architectural learning. The key elements of transformative learning identified in Chapter 2 (i.e., critical self-reflection of value and beliefs, sharing of experiences with others through meaningful communication and the collaborative process of design) are difficult to measure in a dynamic learning system, as interaction within the system prompts situations and experiences to change. As such,
additional methods are needed to map the contexts of learning over time, record the influence of individuals’ previous experiences and capture the learning processes. The methods described in this section extend the documentation of architectural education programs beyond the single ‘snapshot’ or moment typically captured. The evidence collected for the selected architectural education programs can be found in Appendix C, while the evidence of the case studies of architectural learning can be found in Appendix D. The findings from the analysis of this evidence are discussed in Chapter 5 in the accompanying thesis.

B.1 Documenting Architectural Education as a System of Learning

In this thesis, architectural education is considered a dynamic system of learning that has the capacity to shape the values that influence everyday behaviour. Global ranking methods are tightly focused on assessment of programs ability to meet student needs and professional expectations. However, to support the change in the practice being demanded by theorists (Buchanan 2012; Dutton 1987; Llewellyn-Davies 1960; Nicol and Pilling 2000; Slessor 2012), architectural education programs are explored in this thesis as a means of shifting the values and world views of graduates. The system of learning as an organisational framework has informed how architectural education programs can be viewed differently. The elements of the systems of learning (i.e., the multiple contexts of learning, the people involved and their roles, and the interactions that occur) can be defined for individual architectural education programs. The contexts of learning (i.e., the built, natural, social and educational) and the people involved (i.e., the students, staff and communities) can be documented using traditional mapping techniques to take a broader view. The epistemological positioning of the programs is documented to understand how knowledge is likely to be developed. The skills and abilities that are expected of students as they progress through the programs are documented to determine the types of communication and the nature of the interactions that are supported within the programs. The ways in which learning is made visible are documented to identify opportunities for reflection and critical review.

A survey of information made available online by the relevant institutions provides snapshots of current practices in architectural education programs. The type of data collected includes information about the location of the program and the surrounding areas, the institutional setting, the structure and curricula of the program, the allocation of staff to the different areas of the curriculum, the number of students and staff, the types of learning activities offered, the admission processes, the types of learning outcomes, and the facilities offered. The online information used in this investigation is typically provided by the
institutions, most commonly through the university website. While the details of this information may change, it is recognised that the information is not provided for this purpose, and some assumptions and generalisation have been made based on evidence that relates to a typical situation or a broader, institutional context.

The multiple contexts of the system (i.e., the built, natural, social and educational) are mapped using the online information about the physical location of the program, the surrounding areas, the institutional setting and the facilities provided. Information about curriculum and pedagogical practices is used to measure the interaction within the system. The types and roles of participants are defined using enrolment figures and allocation of staff to teaching activities. The epistemological positioning of the programs is determined through an examination of the learning activities and spaces. The entry requirements and processes are used to identify assumed skills and abilities. Evidence of the progress and outputs of the program are sought to understand the ways in which the learning is made visible.

These methods are used as an alternative way of examining architectural education programs. The information is used to identify similarities in situations and to provide comparison between the selected architectural programs. However, it is not the intent of this study to identify trends and patterns, or to determine casual relationships between architectural education, learning experiences and transformation. Rather, the aim is to identify the characteristics of architectural learning; determine how the core skills of critical reflection, communication and collaboration can be developed; and account for the different situations, events and activities in which transformative learning can take place.

**B.1.1 The Multiple Contexts of Learning**

Maps and images of the university campus and the surrounding environs are used to place the learning experience within a broader physical context at a campus and urban scale. This approach enables the documentation of the formal learning environments (e.g., the individual building) and the broader physical context (e.g., the suburban or urban fabric). A walkable catchment area (i.e., a pedestrian schedule or Ped Shed) (Western Australian Planning Commission 2007) with a radius of approximately a 12-minute walking distance (i.e., one kilometre) is mapped for each of the selected architectural education programs (see Figure 7).
For each of the selected programs examined, Google Maps is used to examine the different types of land-use within the catchment area as the different zones of use are indicated, to determine how much of the built environment is associated with each land use. The different land-uses mapped include natural (i.e., landscaped, or native areas, and bodies of waters), residential and commercial areas, civic buildings (i.e., hospitals, museums, and trains stations) and education buildings. This method of mapping is used to assess the composition of the built environment (Western Australian Planning Commission 2007) and is applied here as a means of determining the types of environment most likely to be experienced by individuals within the architectural education programs. The composition of the environments for the selected programs is illustrated using pie charts, as shown in Figure 8. The findings from this mapping inform the assumptions made about the types of everyday activities and situations that could be experienced within walking distance of the architectural education programs, contributing to informal architectural learning experiences.
The social context is measured using the options available for accommodation, as it is assumed that social activities often take place close to the place of residence. In some cases (e.g., UCLA and Rural Studio at Auburn University), the type of accommodation available is specifically identified in the information available online. In others (e.g., TU Delft and UCL), the information about the accommodation opportunities are general. In these instances, the researcher’s assumptions about the social context are based on information provided online about the availability of residences on or near campus, the restrictions placed on the university-controlled facilities and the promotional material provided to prospective students.

The academic structure of university (i.e., departments, schools and faculties) is used to define the educational context of the selected architectural education program. As some organisational structures allow for more autonomy than others the options and opportunities for targeted and flexible curricula can be determined. Architectural education programs can be located within a dedicated school or institution (e.g., SCI-Arc), within departments of schools or colleges (e.g., College of Environmental Design, Graduate School of Design at Harvard University) or within schools in faculties (e.g., Bartlett Faculty of Built Environment at UCL). Architectural education programs can be aligned with other built environment studies, such as planning or construction at a school (e.g., School of Architecture and Planning at MIT) or faculty level (e.g., Faculty of Architecture and the Built Environment at TU Delft). The location of the programs within the institutional structure can influence the level of autonomy within the program, and the extent to which cross-disciplinary activities are possible. As such, the researcher identified the opportunities for participants to be exposed to diverse world views, to share experiences of different educational programs and to collaborate across disciplines.
The methods of documenting the multiple contexts of learning enable priorities within the architectural education programs to become evident. The overlapping of the contexts in the system of learning diagram is used to represent this hierarchy (see Figure 9). Many programs are tightly focused on the curriculum and the development of skills and knowledge giving priority to the educational context. Some programs give priority to the built context, as dedicated buildings, university campuses and the urban fabric are referred to as a teaching tools and learning resources. The social and natural contexts are not often explicitly referred to in the information available as part of the learning experiences, and as such, are understood to hold a lesser priority.

![Figure 9: The Hierarchy of Contexts](source: Massachusetts Institute of Technology (2015)).

**B.1.2 The People Involved and their Roles**

The people involved in architectural education programs are accounted for by recording the overall size of the student population (see the larger circles in Figure 10), the number of staff (see the smaller circles in Figure 10) and the ratio of staff to students. The staff-student ratio is represented as an average to account for some activities (e.g., studio) being taught at a ratio less than other activities (e.g., lectures). The relative size of the two circles in the diagram illustrates a low staff-student ratio when the circles are similar in size (see left, Figure 10). A high staff-student ratio is demonstrated by the size of the circles differing significantly (see right, Figure 10). A record is also made of the number of full-time staff members (see dark blue circles, Figure 10), and part-time staff members (see light blue circle, Figure 10) to determine the diversity of the staff. Those who typically participate outside...
formal contractual arrangements (i.e., practitioners and community representatives) are included in the part-time staff numbers.

![Figure 10: Ratio of Staff-Student Population](image)

*Massachusetts Institute of Technology (left), University College London (centre), and Berkeley University of California (right)*

Source: Massachusetts Institute of Technology (2015).

The students, staff and communities involved in the architectural education programs can take different roles during learning activities such as presentations, public lectures and industry events. When the level of participation is documented, these roles can be identified as novices (i.e., passive observers attending the event), or as experts (i.e., people actively involved as organisers or researchers) (see Figure 11).

![Figure 11: The Roles of Novice and Expert](image)

*Massachusetts Institute of Technology*

Source: Massachusetts Institute of Technology (2015).

**B.1.3 Interactions within the Learning Experiences**

The ways in which students, staff and communities interact within the learning experiences can be observed in the online information provided by the institutions. Types of assessment (i.e., group and individual projects) demonstrate students’ levels of interaction with each other. The nature of the publications and events held throughout the year demonstrate the pedagogical approach. Learning activities that focus on the progress of the projects can provide formal and informal opportunities for peer review, feedback and critical
reflection. End of year activities focus on the learning outcomes and often demonstrate success in the different modes of communication developed through meaningful interaction.

The proportion of curriculum content taught in each of the subject areas is documented for the architectural education programs (see Figure 12). The definition of subject areas is informed by the International Union of Architects (UIA) Validation System for Architectural Education (UIA (International Union of Architects) 2014). Developed as a reference for programs of architecture globally, this validation system defines core capabilities that must be developed by students of architecture (UIA (International Union of Architects) 2014, 9). The knowledge capabilities are identified as cultural, social, environmental, technical, design and professional studies. The skills identified are primarily visual communication skills. These categories generally align with those used by Ostwald and Williams (2008) in their analysis of architectural education in Australasia.

Credit points have been used to determine the proportion of curriculum content in each of the subject areas, rather than formal teaching contact time or amount of assessment. The types of the learning activities (e.g., lectures, tutorials, seminar or studios), and the teaching spaces in which these classes take place have been documented to illustrate the nature of the teaching and learning experience. For example, it is difficult to teach a collaborative studio in a lecture theatre. Therefore, activities within a lecture theatre are assumed to be lectures that deliver information to all students consistently and those activities held in a studio are assumed to focus on personalised learning for small groups of students.

![Figure 12: The Taught Curriculum, Undergraduate (left) and Postgraduate (right) Architectural Programs, Massachusetts Institute of Technology](source: Massachusetts Institute of Technology (2015)).

The types of learning activities that take place, the content that is taught, and the types of teaching spaces used can illustrate the types of interactions that occur within
architectural education programs. However, people can be involved in these interactions differently. The number of staff in the subject areas (e.g., cultural studies, applied studies, design studies and visual studies) recorded as a Venn diagram (see Figure 13) illustrates whether staff teach in more than one of these subject areas. Cross-curricular teaching, wherein students may be taught by the same staff member in different subject areas, supports students’ understanding of a concept from multiple points of view. Skill in more than one subject-specific language can be developed by students as they explore similar concepts differently.

Figure 13: Allocation of Staff to Subject Areas

Massachusetts Institute of Technology

Source: Massachusetts Institute of Technology (2015).

8.1.4 Epistemology and World Views

The survey of information made available online by the relevant institutions has been used to identify learning activities that support the application of theory in practice, and the transfer of knowledge and understanding from the known-of world to the known world. The key elements of learning experiences are aligned with the epistemological positions discussed in Appendix A to form an understanding of the epistemological approach of architectural education programs. The key learning activities illustrate how different aspects of the program contribute to development of knowledge and the formation of world view. These learning activities are shared spaces (e.g., when a learning space is used for multiple subject areas), cross-curricular teaching (e.g., when staff teach in multiple subject areas), integrated learning (e.g., when learning activities are shared across year groups or assessment tasks are common across subject areas), selective units (e.g., when students select from a range of topics within a
unit or course), options (e.g., when students select subjects from a predetermined list),
electives (e.g., when students select subjects from outside the structured program) and
learning-in-place (e.g., when formal learning activities take place within a community or site of
campus). The epistemological scale aligns learning activities focused on the known-of world
and shared experiences (i.e., shared spaces and cross-curricular teaching) with a positivist
epistemological position, and learning activities in which the known world and personal
experiences are at the core of the learning (i.e., (s)electives/options and learning-in-place) with
an interpretivist position. Figure 14 illustrates the epistemological positioning of an
architectural education program with the shading of the dot indicating the level to which the
experience is provided throughout the program. The black dot indicates that the provision of
that type of activity is evident. The grey dot indicates some evidence of the learning activity in
the program. The white dot indicates minimal or no evidence of the learning activity.

![Diagram of epistemological positioning of learning activities]

**Figure 14: Epistemological Positioning of Learning Activities**

*Massachusetts Institute of Technology*

Source: Massachusetts Institute of Technology (2015).

The provision of shared teaching and learning spaces is considered in this study to be
indicative of a positivist position, as rules and known facts presented in one subject area can
be referred to and applied in another subject area. This reference can occur either explicitly
through visual displays, presentations and exhibitions in common space, or implicitly as the
same space is used for similar learning experiences in different subject areas (e.g., problem-
based exercises held in both design and applied subjects, such as in a shared studio space). The
timetables available online for the selected architectural education programs are used to
determine whether formal learning activities are held in shared spaces. Also considered is the
extent to which learning spaces are dedicated to the architectural education programs. The
learning activities for the selected architectural education programs are typically held in purpose-built facilities, provided for the primary use of the architectural education program. It is assumed that all or most classes are conducted within these buildings as typically architectural education programs require specialist spaces (e.g., studios and workshops).

Cross-curricular teaching can provide different points of view of a given situation or project, requiring the use of a common language across the curriculum. This is considered within this study as an indication of positivist epistemological position. Staff that teach across curricula in two or more subject areas are able to explain how the rules and known facts discussed in one subject area may apply in another subject area. The use of similar language across the subject areas makes the different meanings and associations of certain terms and phrases explicit.

Integrated learning is accounted for by determining the extent to which learning may be shared across years within a program, or understanding gained in one subject area may be explicitly applied to other subject areas. This type of learning activity can be considered either positivist or interpretivist. The relevancy of given rules and guidelines becomes more explicit in these learning activities wherein senior students, graduates and professionals are involved as mentors or tutors for junior students, which supports the sharing of experiences. As such, the epistemological position of those involved, whether it is more positivist or interpretivist, also becomes more explicit as students and/or staff are required to explain their understandings.

Architectural education programs that provide students with choice (i.e., selective units, electives and options) encourage students to direct their own learning. These types of learning activities are considered in this study to reflect a more interpretivist position, as an understanding and awareness of personal abilities and experience often informs students’ choices. Information provided online about the course structure, the curriculum statement, and the unit outlines and descriptors have been used to determine whether an architectural education program offers such choices to students.

Opportunities to learn-in-place, outside the formal classroom, provide students with interpretivist learning experiences that expand their known world. Learning activities can include design-build projects, involvement with communities and professional placements. Typically, this type of learning activity requires students to apply the knowledge and skills learned in the classroom to real-world situations, often supported by people (i.e., practitioners and community representatives) who can be difficult to engage with elsewhere.
B.1.5 Assumed Skills and Abilities

The selected architectural education programs require potential students to demonstrate certain skills and existing abilities. For undergraduate programs, the skills required do not differ from those non discipline-specific skills required for admission into university. For postgraduate programs, these assumed skills are discipline-specific. Masters programs may have multiple entry pathways and the process of admission ensures that admitted students can meet the levels of skill and abilities expected. Accounting for these assumed skills and abilities illustrates whether the different abilities relevant to architectural learning (i.e., academic, emotional, spatial, practical and social) and communication (written, spoken and visual languages; and environmental literacy and numeracy) are supported (see Figure 15).

![Diagram of assumed skills](Massachusetts Institute of Technology (2015))

Entry into postgraduate architectural education programs involves a process of application and the criteria for selection, which indicate the skills and abilities that are required, are clearly described. Typically, eligibility focuses on academic ability, spatial intelligence and written, spoken and visual communication skills, gained through prior learning experiences (i.e., completing a relevant undergraduate program). However, the other key abilities (i.e., emotional, practical and social intelligences) and communication skills (i.e., environmental literacy and numeracy) are not necessarily explicitly recognised and the students’ levels of capability in these skills and abilities are assumed. Requiring students to have experience in extra-curricular activities (i.e., peer mentoring, leadership roles and networking events) is an expected demonstration of emotional intelligence. Certain levels of practical abilities are assumed to support students in learning activities that require trade skills, construction experience or professional practice. Social intelligence is expected when students are likely to participate in community projects. While discipline-specific languages and abilities serve to focus the programs, it can limit the opportunities for challenging current positions and prompting a shift in world view. Different world views and ways of sharing are brought to the learning experiences when diverse skills exist within a student cohort.
B.1.6 Learning Processes

The visible outcomes of architectural learning are typically observed at public exhibitions and events, in the publications of students and staff, and at lectures and seminars as part of the formal learning activities (e.g., community events, conferences and symposiums). The learning process is made visible when student work is exhibited during the teaching period and progress of skills and knowledge is demonstrated. Typically, assessment is used to clearly identify the skills and knowledge gained by the individual; however, demonstrating collaboration skills can be difficult in individual assessment. The inclusion of formal group assessments demonstrates the capacity of architectural education programs to develop students’ collaboration skills and understanding gained through meaningful engagement with others. The learning processes visible in architectural education programs are often focused on the development of students’ professional skills. However, staff are also active as learners, as they develop and strengthen their academic knowledge and skills. When the professional and the academic learning of students and staff within architectural education programs is made visible, the relevancy of learning activities is increased and interaction between profession and academia is supported.

Evidence of visible learning processes is ascertained by the information provided online to illustrate how the learning process is made explicit in the selected architectural education programs (see Figure 16). The thicker lines indicate there was high visibility of the learning process, as evidence of outcomes, assessment or learning was found in the online information reviewed. The thinner lines indicate the learning was not highly visible.

![Figure 16: The Visibility of the Learning Process](Massachusetts Institute of Technology)

Source: Massachusetts Institute of Technology (2015).
B.1.7 Connecting Learning and the Everyday

For the selected architectural education programs, images of the buildings and facilities available online have been used to illustrate the use of the built environment as a teaching tool. Regular experiences of such environments can embed specific architectural language into the learning experiences (e.g., culturally specific architectural language at MIT [far left, Figure 17], the use of acoustic design strategies at UCL [left, Figure 17] and the expression of structure TU Delft [right, Figure 17]). Additionally, the design of the built environment can make architectural learning processes explicit (far right, Figure 17). When the role of the built context of learning experiences is regarded in this way, the understanding gained can be applied to everyday experiences and environments.

Figure 17: Building as Teaching Tool

Architectural Language, Massachusetts Institute of Technology (far left); Design Strategy, University College London (left); Construction, TU Delft (right); Architectural Learning, Berkeley University of California (far right).

Source: Massachusetts Institute of Technology (2015; far left), University College London (2015; left), Delft University of Technology (2015; right), Berkeley University of California (2015; far right).

These methods of mapping contexts, charting curriculum and learning activities, and diagramming the structure and process of learning have been applied to selected architectural education programs. This documentation can be found in Appendix C. Analysis of this evidence has provided insight into the complex process of architectural education that is difficult to gain through traditional global ranking methods. However, these measurements are unable to capture learning experiences that occur over time, or the way in which a shift in world view influences and changes behaviour. Although students’ acquisition of the core skills (i.e., critical thinking, communication and collaboration) can be measured through assessment, accounting for the experiences that support this development requires a different way of looking at transformative experiences in architectural learning.
B.2 Documenting the Experience of Architectural Learning

Additional documentation methods are used to account for the transformative experiences that occur within the architectural education programs. This documentation is necessary to describe the way in which transformation is prompted, supported and sustained, and recognise the changes that occur as a result of learning. The documentation of learning experiences is extended beyond the single ‘snapshot’ or moment; interactions and transformations are recorded alongside milestones and outcomes. The researcher was immersed in the learning system when visiting the architectural programs, and observed and recorded the learning activities. Many methods have been used to document the contexts of architectural learning, capture the experiences of different people involved and record the diverse interactions that take place. The role of those participating within the learning experience can be identified by documenting the more immediate experiences, as well as those that have taken place over the long term.

This approach conveys a sense of the complexity of the situations in which the learning can occur. As such, the full extent of the learning system is captured. The learning activities were recorded by attending and observing selected classes within the chosen program, but not participating. These classes were selected to record actions and situations related to the subject focus, the cohort involved, or the staff members coordinating the events. Series of sequential photographs were taken to document the context of journeys to and from formal learning activities. The places visited included the learning spaces, as well as local suburbs and/or towns. The influence that prior experiences have had on those involved in the programs was recorded through interviews. The language (verbal and non verbal) of those involved in the architectural education programs was captured through interviews. Members of the senior leadership team of each organisation, and the directors, coordinators or instructors of the programs were interviewed. The resultant narratives have provided insight into the staff’s educational background, the situations that led to their involvement in the architectural education program, the broader institutional context, and the context of organisational change. This provided insight into individuals’ capacity for change within a system or institution.

In the following sections, these methods of documentation are demonstrated using examples of the evidence collected from three case studies of architectural learning (i.e., Master of Sustainable Design at University of South Australia, Rural Studio at Auburn University, and the Firstlight Project at Victoria University of Wellington). A more
comprehensive summary of the evidence collected from these case studies and the findings can be found in Appendix D.

### B.2.1 Mapping Contexts

The aforementioned methods of documenting the contexts of the learning experience have been employed for each of the three case studies. Visiting these architectural education programs and being in place has enabled the mapping methods to be refined. As such, significant detail was documented about the contexts of learning. Each case study has been mapped to determine the nature of the contexts (i.e., the built, natural, social and educational) in which the learning experiences took place and the interaction that occurred between these contexts to understand how these contexts support transformative learning.

The method of mapping walkable catchment areas discussed earlier (see Figure 7) has been further developed to map the physical context in more detail, and to more accurately identify the key elements of the physical fabric that relate to the learning experience. It is critical that the researcher undertook this mapping in place by walking, observing and noting the different elements of the built fabric. These maps capture the intended use of the spaces, the definition of the boundaries and transition spaces, and the architectural language. This method of mapping enables the built and natural contexts to be defined and some understanding of the social context to be gained. However, this mapping documentation prioritises the visible elements of the physical environments (i.e., the built and natural contexts) and as such, the maps may not accurately reflect the nuances in the actual use of the environments or changes in use due to daily and seasonal variations. Consequently, this form of documentation has a limited contribution to an understanding of the dynamic social context.

This method of mapping contexts was applied to those case studies in which the built context was complex and diverse and was evidently meaningful for those involved in the architectural education program. For example, many staff and students from Victoria University of Wellington lived, worked and socialised close to the campus which is located in the heart of a busy, well-populated urban area. Additionally, extra-curricular learning activities that took place off campus were often held within walking distance of the School of Architecture Building. As such, a walkable catchment of 500-metre radius was mapped. Figure 18 illustrates the line map that formed the base for subsequent maps.
Panoramic and sequential photographs were used to objectively capture the elements of the built and natural contexts and capture details of the contexts that are difficult to map. Photographs enabled the language of the physical contexts to be examined closely and the interactions at that moment to be captured. These panoramic photographs (see Figure 19 and Figure 20) illustrate what can be observed from a single point, capturing surrounding environments that are typically cropped out of view when photographing specific projects.

The photograph sequences are snapshots taken at regular intervals (e.g., at every lamppost). The sequences objectively document the surrounding environment and the journeys made by participants regularly (e.g., the journey from the main campus to a satellite campus or university building within walking distance). An example of this can be observed in Figure 21.

Changes in the context that may influence how experiences can be interpreted were documented by visiting places more than once, returning at different days to observe and record how people were using the spaces through their interactions with others and with their contexts. The photographs in Figure 22 document the different ways in which a shared common space is used for community events, sharing experiences and exhibiting learning
outcomes. These photographic methods of documenting context have been used for all three case studies. Some of the evidence collected can be found in Appendix D.

Additionally, the methods used to map the educational context discussed earlier (i.e., mapping the proportion of curriculum content taught in each of the subject areas, types of assessment, learning activities and teaching spaces) were extended. At Rural Studio at Auburn University, this extended mapping included the projects completed as part of the learning experience. Documenting the types of projects designed and built, the people involved (i.e., staff and students) and the communities in which these projects were built of the projects was a way of further exploring the interactions between curriculum and place (see Figure 23). The mapping of the curriculum of the program at Victoria University of Wellington was extended to include the activities of the staff beyond teaching, such as their research and practice (see Table 3). The learning activities were less integrated across the program and the timetabling more conventional.

The additional methods used varied according to the information available and the nature of the program. The methods were responsive; they adapted to the information, equipment and access to facilities available at that time, the situation and type of learning experiences, the access to various participants and the complexity of the specific program.
Figure 19: Panorama of External Built Fabric
Victoria University of Wellington
Source: author’s own (2012).

Figure 20: Panorama of Formal Learning Space
Victoria University of Wellington
Source: author’s own (2012).

Figure 21: Photographs Sequences of the Journey between Campuses
Victoria University of Wellington
Source: author’s own (2012).
Figure 22: Photos of Shared Common Area
Victoria University of Wellington

Source: author’s own (2012).

Figure 23: Mapping Curriculum and Place

Source: author’s own (2012).
Table 3: Mapping teaching, research and practice at Victoria University of Wellington

<table>
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<th>Applied</th>
<th>Design</th>
<th>Visual</th>
<th>Interactions</th>
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<td>●</td>
<td></td>
<td>Mostly sole authorship and with Academic B</td>
</tr>
<tr>
<td></td>
<td>Teaching</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>International student competition</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>Involved with 3 practices in Wellington</td>
</tr>
<tr>
<td>Academic A</td>
<td>Research</td>
<td>●</td>
<td>●</td>
<td></td>
<td>Mostly sole authorship and with Academic F</td>
</tr>
<tr>
<td></td>
<td>Teaching</td>
<td>●</td>
<td></td>
<td></td>
<td>International university</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic B</td>
<td>Research</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>Mostly sole authorship</td>
</tr>
<tr>
<td></td>
<td>Teaching</td>
<td>●</td>
<td></td>
<td></td>
<td>Multiple disciplines</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>●</td>
<td></td>
<td></td>
<td>Local and international communities</td>
</tr>
</tbody>
</table>

Source: author’s own (2012).

**Coding of Contexts—Reflective Analysis**

The process of documenting and mapping required the researcher to observe and look closely and objectively at the documentation as it was collected. The pace of the analysis was tempered by the daily tasks of reorganisation, distillation and curation of the maps and photographs. Curating the evidence in this way condensed the information. Consequently, critical moments, activities or situations could be identified.

In this study the photographs were visually coded to explore the diversity and complexity of the contexts. The visual analyses of the photographs were coded using an approach that is typically applied to written texts in which a line-by-line reading of the data identifies as many ideas and themes as possible (Urquhart 2013, 25). In this analysis, photographs were coded by identifying critical elements of the contexts. Similar elements were brought together to identify patterns and determine a visual language. As such, the connection between the individuals and their experiences can be understood through this interpretation of everyday environments (Dovey 1990, 4). The common language of the architectural education programs emerged when the connection between experience and the built environment was strong, demonstrated by multiple activities or a concentration of occurring.

In the walkable catchment areas mapping, certain dominant features of the contexts and situations emerged allowing specific categories and their properties to be identified. The curriculum maps were coded focusing on links and relationships among selected categories relevant to the particular case. In the case of Victoria University of Wellington, 15 individual
maps were made of a 500-metre radius catchment area (see Figure 24). These maps were used to record certain aspects of the built fabric (e.g., the age, material, height, types of use at ground level and above, and passive design), the types of fabric (e.g., landscape and buildings), the types of use of buildings (e.g., education, residential, recreational, and commercial), the infrastructure (e.g., private or public transport), and discipline-specific uses (i.e., those relating to the architectural profession).

At Mawson Lakes, an example of the sustainable development that is the focus of the program at University of South Australia, a suburban park was photographed. The panoramas have been layered to identify the elements of sustainable design. Figure 25 highlights the visible active elements (e.g., solar panels and water tanks). Figure 26 highlights the visible passive elements (e.g., sun shading, operable windows, and examples of optimised orientation).

Photographs taken at Rural Studio illustrate how individuals can be observed interacting in different ways with different people. These different interactions can diversify the way in which experience is shared. While students are learning-by-doing (see Figure 27, left) the staff member (circled in blue) is passive (i.e., not interacting with the students). However, another staff member (circled in red) is active, as she demonstrates a complex skill. In a more formal learning activity (see Figure 27, centre), both staff members discuss the tasks as students learn together. Being in place together at social activities (e.g., community lunches) enables staff and students to share experiences, although this does not always occur (see Figure 27, right).
Figure 24: Coding Walkable Catchment Mapping, Victoria University of Wellington

Source: author’s own (2012).
Figure 25: Coding for Visible Active Elements
Mawson Lakes, Adelaide, South Australia.

Photographs: author’s own (2012).

Figure 26: Coding for Visible Passive Elements
Mawson Lakes, Adelaide, South Australia.

Photographs: author’s own (2012).

Figure 27: Staff-student Interaction
Learning-by-doing (left), Formal Learning (centre), and Being-in-place (right) at Rural Studio.

Photographs: author’s own (2012).
The analysis of the mapped contexts has consolidated by the languages and patterns found in the documentation. The four contexts identified in the system—built, natural, social and educational—are defined in relation to architectural education and climate-responsible design. The different characteristics of these contexts, which were found in the details of environmental activities and situations have been summarised in Table 4.

**Table 4: Summary of Coding Framework for Mapped Contexts**

<table>
<thead>
<tr>
<th>Context</th>
<th>Characteristics</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built: demonstrating responsible design</td>
<td>Active elements: providing efficient performance</td>
<td>Solar panels, water tanks, and air-conditioners</td>
</tr>
<tr>
<td></td>
<td>Passive elements: operable mechanisms, encouraging interaction</td>
<td>Materials and construction, form and volume, and siting</td>
</tr>
<tr>
<td></td>
<td>Boundaries: promoting interaction</td>
<td>Low in height, visually permeable, and physically accessible</td>
</tr>
<tr>
<td>Natural: connecting with nature</td>
<td>Moderated environments: replacing lost environments</td>
<td>Plants and planting, habitats for fauna, and trees at high level</td>
</tr>
<tr>
<td></td>
<td>Unmoderated environments: conserving native environments</td>
<td>Endemic vegetation, and evidence of fauna, sky and water</td>
</tr>
<tr>
<td></td>
<td>Passive elements: climate-responsive design strategies</td>
<td>Shading/weather protection, openable windows/dors, and movable furniture</td>
</tr>
<tr>
<td>Social: supporting interaction</td>
<td>Social groups: providing spaces for people to come together</td>
<td>Shared common values, similar needs, and common knowledge / abilities</td>
</tr>
<tr>
<td></td>
<td>Gathering places: opportunity to come together</td>
<td>Shared social spaces, intimate spaces, and private individual spaces</td>
</tr>
<tr>
<td></td>
<td>Learning together</td>
<td>Shared learning outcomes, peer to peer learning, and curriculum and cohort integration</td>
</tr>
<tr>
<td>Educational: visible learning</td>
<td>Learning-by-doing: experiential learning</td>
<td>Opportunity for action, engagement with others, and project based learning</td>
</tr>
<tr>
<td></td>
<td>Learning experience: how, who and where</td>
<td>Formal activities, informal events, and tacit learning</td>
</tr>
<tr>
<td></td>
<td>Being-in-place: knowing the world</td>
<td>Experiencing change, building knowledge, and expanding known world</td>
</tr>
</tbody>
</table>


These characteristics relate to the contexts differently. To demonstrate the complexity of these relationships, the characteristics are aligned with the contexts in which they have been found (see Figure 28). Some of the characteristics relate to a single specific context and exemplify these contexts within the specific system of learning. For example, active elements (i.e., man-made technological solutions to ensure comfort and energy efficiency) relate directly to the built environment. Unmoderated environments (e.g., the sky, endemic flora and fauna, and natural water features) are specific to the natural context. The context of the learning, the type of activity, and the teaching practice are part of learning-by-doing. The composition of social groups (e.g., groups of like-minded people, those with similar needs or those with shared or common knowledge) supports people coming together to learn.
Some of the characteristics relate to two contexts and support interaction between these contexts. Moderated environments retain some characteristics of the natural context but are man-made (i.e., built). Certain characteristics of boundaries (e.g., visual permeability and accessibility) promote interaction between the built and social contexts. Learning together brings communities together to share experiences and learn from each other. Being-in-place supports individuals’ practical understanding of learned theory.

Other characteristics are common to three contexts. The different scales of gathering spaces within the built context allow for diverse social groups of different sizes to learn. When
formal and informal learning experiences take place in a natural context, individuals learn about that context as well as from that context. Fixed passive elements of the built context require the designer to understand the performance of the built environment in given natural contexts. Operable passive elements require the users to understand when and how to manipulate the built environment in response to changes in the natural environment.

This process of mapping—spending time in place, observing and experiencing—deepened the researcher’s understanding of the contexts of learning. The documentation of the dynamic nature of the contexts and how they change over time and through use enables the interaction between place and people to be analysed. Analysis of these contexts and their relationships broadened the view of the learning experiences as the ways in which these interactions influence change within the system became explicit.

B.2.2 Interviewing Those Involved

Interviewing the people involved in the architectural education programs enabled the researcher to document change within the programs, providing a context for the analysis of the documentation. The interviews were structured to establish an understanding of the program, the current role of the individual and their previous experiences. Leadership teams were interviewed to develop an understanding of how the program has been able to respond to change over time and how this change has been managed. These staff members (e.g., program directors and lecturers) were chosen as they had the capacity to initiate direct and control changes within the architectural education program. As the interview format relied on the narrator reflecting and retelling personal experiences, the staff members were interviewed alone and the interviews took place in environments that were comfortable and familiar. Typically, this was the workplace. In this study, it was important that the narrator felt comfortable talking with the researcher. As such, the interviews were conducted part way through the researcher’s visit to the program, once the researcher and the staff member had become known to each other. This familiarity enabled the researcher to refer to recent shared experiences when it was necessary to prompt the narrator, or re-direct the interview. Responses to the question ‘What does learning mean for you?’ are as follows.

‘What I find quite interesting about the process of learning is drawing the connections between things that you might not previously have recognised or anticipate[d] as being connected.’

Academic A, University of South Australia
‘It’s more about awareness because once I’m aware of something I can choose to explore it further, but it’s that whole thing of not knowing what you don’t know and once I’m aware that I don’t know something, then it’s my choice to then learn more about it.’

Student K, University of South Australia

‘Becoming familiar and understanding concepts, I think, is the first thing that comes to my mind. I don’t think that I would have been able to articulate that as quickly had I not had the job that I have now.’

Academic B, Rural Studio

‘Learning is exploring and discovering so it’s really [about] finding out as much as I can, everywhere and fill it. [It] will always be—it’s something intuitive. I don’t think about it—it’s already happened.’

Academic C, Rural Studio

‘I think there’s certainly a difference between learning facts and ... learning to think critically which I think is really important ... because the technology is changing so fast, they sort of need the ability to evaluate situations as they are because you know it’s so technology-specific and culture-specific and context-specific.’

Academic A, Victoria University of Wellington

‘I think, to me, learning really needs to be backed up with practical experience and that’s a huge part of it. That’s where I sort of despair at times with the university experience—people will be taught something and so you know, we say it out loud or we show pictures or we write things on the wall, but students won’t learn unless they do.’

Academic F, Victoria University of Wellington

**Coding Interviews—Narrative Analysis**

The semi-structured interviews took between 45 and 75 minutes each. The individuals spoke at length describing events and situations in their past. There was minimal interaction between the researcher and the person being interviewed beyond the short prompts from the interviewer when required. Therefore, the resultant narratives typically took the form of a
Within these stories, there was a sequence and consequence as the storyteller related events and personal experiences. This storytelling form included narratives of personal experience, long sections of dialogue and extended accounts of prior events. The person being interviewed described events and situations in their past with minimal prompting and guidance. The narrator selected, organised, connected and evaluated prior events as they created their own stories. The format and nature of the interview prompted self-reflection as the person being interviewed constructed their narrative. Through retelling an experience, the narrator relied on previous experiences, memories and meaning to interpret the experience. Such narratives offer insight into how meaning is made and the world view from which the story is told.

The narratives do not have unanalysed merit and three methods of narrative analysis—interactional, structural and thematic—can be used to interrogate the intention and language of the texts, and assess how and why the events are storied (Riessman 2004, 707). In this study, thematic analysis was used to find common thematic elements across several situations. This method highlighted what was said rather than how it was said. This was important when considering transformative learning. A focus on the content of the narrative serves to make values and world views more explicit and the meaning that underlies the narrative can come to the fore. However, common thematic elements across several interviews can be found when the language in the narratives is similar. In this study, as the case studies all focused on architecture, evidence of a discipline-specific language was also sought.

Within the narratives, the scale and complexity of the social groups were identified. The scale of the social groups ranges from small (e.g., individuals or pairs), medium (e.g., groups of four to six people) and large (e.g., an entire class, cohort faculty or community). The complexity of the group was reflected in the interactions across social groups with diverse beliefs and opinions, or within groups of like-minded individuals with similar beliefs and motivations. Some of the individuals within a learning experience may not be connected to others at all, and instead are isolated or discrete.
Table 5: Summary of Coding Framework for Interviews

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale of social groups</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Large</td>
</tr>
<tr>
<td>Complexity of social groups</td>
<td>Interconnected</td>
</tr>
<tr>
<td></td>
<td>Intraconnected (like-minded)</td>
</tr>
<tr>
<td></td>
<td>Isolated/discrete</td>
</tr>
<tr>
<td>Benefit of learning</td>
<td>Direct/individual</td>
</tr>
<tr>
<td></td>
<td>Reciprocated</td>
</tr>
<tr>
<td></td>
<td>Shared</td>
</tr>
</tbody>
</table>


From these narratives, a method was developed that documented the experiences of transformative architectural learning and the world views of individuals involved. These narratives located different people and places within individuals’ learning experience. This method was used to better understand the communities described in the narratives, and the connections and relationships that occurred between the people involved. The shared social and educational experiences form an individual’s known-of world. The places and people with whom the interviewee interacted directly represent their known world. The photographs taken during the researcher’s visit to the architectural education programs captures experience within this known world. The photographs were used to identify how knowledge and experiences are shared, and how this practice influences the learning outcomes.

Learning experiences can directly benefit individuals (e.g., individual assessment that leads directly to valued learning outcomes). Additionally, the learning experience can be of reciprocated benefit when all involved (e.g., staff, students and community) are positively affected by the learning process. In some cases, the learning experience of individuals may be shared with others for mutual benefit. In the narratives, these benefits are accounted for in the activities observed by the individual, or in the tangible outcomes of their learning. The findings of this narrative analysis are diagrammed to understand the connections made by an individual within their communities and their experiences of different world views.

Figure 29 models the communities and world views of Academic B at Rural Studio. The concentric circles represent the worlds of the individual: the self-world is the solid circle, the known world is the solid line, and the known-of world is the dashed line. The communities to which Academic B is connected are shown with ellipses of varying scales: the solid line represents the known world of the communities and the dashed line represents their known-of world. When the experiences of and within these communities coincide (i.e., the circles and...
ellipses overlap), learning experiences are shared and the opportunities for transformation are likely.

B.2.3 Observing Interactions

Observation attempts to capture life as experienced by the research participants rather than through predetermined categories (McKechnie 2008, 574). It aims to explain events, situations and behaviour that is unexpected or unusual. The type of information collected through observation can be sociodemographic (e.g., age, gender education, and class) and descriptive (e.g., dress and stature) information. Non-participant observation has been used here, as this research is focused on patterns or examples that emerge from behaviour (Williams 2008, 562). Therefore, the observations provide insight into the interactions that take place in transformative learning experiences, and describe the roles of the contexts and the participants. In this study, observations, field notes, audio recordings and photographs were used to establish the nature of the social interchange, the role of the natural and built environments and the effects on the learning experiences.

The aim of photographing the learning experiences was to capture the range of formal and informal learning activities. Photographs captured the movements and behaviour of people as they moved through a specific place or situation. In Figure 30 the photographs of open spaces and public areas at Mawson Lakes illustrate the different ways in which people interact with a natural context. Behavioural responses to certain situations were recorded by taking sequences of photographs of repeated actions with in different environments. The different ways in which architecture students at Auburn University work individually on the design projects was captured at the Auburn campus (see Figure 31, left) and at Rural Studio (see Figure 31, centre). At Rural Studio, students also worked on design projects in groups (see Figure 31, right). Observing an individual in different situations can make explicit the different interactions and responses to similar situations. At Victoria University of Wellington, Academic C was observed interacting with groups of students at an informal professional networking event (see Figure 32, left), in a formal learning activity (see Figure 32, centre) and individually through unintentional meetings (see Figure 32, right).

Coding of Interactions—Acquired Immersion

The analysis of the evidence collected through observation—the field notes, photographs and reflexive journals—has provided insights about the interactions that take place during learning experiences. These insights have been acquired by visiting the architectural education program for a length of time (e.g., two weeks), and being immersed in
the situations, contexts and events, while not participating in the activities. Relationships between individuals and groups within these programs were explored by examining the size, location and diversity of the social groups. Observations made of the learning experiences have made teacher–student interaction and peer–peer relationships explicit. The characteristics of the contexts are examined in detail to explore the role of the contexts in these interactions that take place. Observing these interactions over time enabled the researcher to identify change in context or transformation of world view.
Figure 29: Mapping Communities and World Views

Academic C, Rural Studio, Auburn University

Source: author’s own (2013).
Figure 30: Examples of Interaction with the Natural Context
Mawson Lake, Adelaide, South Australia.
Photographs: author’s own (2012).

Figure 31: Observations of Similar Learning Activities in Different Spaces
Auburn University.
Photographs: author’s own (2012).

Figure 32: Observations of Academic C in Different Learning Activities
Victoria University of Wellington.
Photographs: author’s own (2012).
Three types of interactions are evident in these observations. First, observing teaching practices has made explicit the different ways in which teachers support learning. Second, the nature of the learning experiences is characterised by the role of the participants (i.e., novice or expert) and the cognitive process involved (i.e., the levels of thinking). Additionally, the modes of learning influence how effectively students gain knowledge and develop skills. Third, the modes of interaction observed relate to the behaviour of the participants (i.e., passive or active), the ways in which experiences are shared (i.e., directly or vicariously) and the relationships between and within social groups.

Table 6: Summary of Coding Framework for Observed Interactions

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching practice</td>
<td>Pedagogical: teaching focused</td>
</tr>
<tr>
<td></td>
<td>Andragogical: student centred</td>
</tr>
<tr>
<td></td>
<td>Critical: adaptive and responsive</td>
</tr>
<tr>
<td>Learning experiences</td>
<td>Roles of the participants: novice/expert</td>
</tr>
<tr>
<td></td>
<td>Cognitive process: levels of thinking</td>
</tr>
<tr>
<td>Modes of interaction</td>
<td>Passive vs. active: those watching and those doing</td>
</tr>
<tr>
<td></td>
<td>Understanding through real or virtual experiences</td>
</tr>
<tr>
<td></td>
<td>Between or within social groups</td>
</tr>
</tbody>
</table>


The three types of teaching practice considered here are pedagogical (i.e., teacher-focused), andragogical (i.e., student-focused) or critical (i.e., change-focused). Each type defines the role of the participants—primarily the students and the teachers—in different ways.

Winter et al. (2008, 1) described pedagogy as a content model of teaching, whereby the transmission of information and skills—predetermined by the teacher—is focused on filling perceived deficits in students’ knowledge and comprehension. In current education practice pedagogy is demonstrated when content is delivered in lectures and then, tutorials support the discussion of set topics and assessment tasks. These activities typically focus on understanding content and theory and learning about skills.

Alternatively, in andragogical practice, the needs of the learners are addressed as teachers facilitate the process of content acquisition by providing leads to other content resources (Knowles 1980). This practice focuses on the learning process. By supporting the learner to become independent and self-directed, the teacher directs learners to relate their
learning to their life experiences (Winter et al. 2008). Andragogy relies on the immediate application of theory to project. Activities such as cross-curricular teaching, shared teaching spaces, and the opportunity for students to select the direction of their own learning requires the learner to be aware of their own learning needs and to actively plan and engage in the learning process (Winter et al. 2008).

Paulo Freire, as cited by Singh (2013), argued that critical pedagogy aims to break down the power nexus between teacher and student and makes explicit the specific power relations and struggles in the educational process. Critical pedagogy promotes reflexivity and critical consciousness as students and staff challenge and question how knowledge is constituted, by whom, for whom and for what purpose (Crysler 1995, 208). Activities in which students are self-directed, construct their own learning experiences and work with staff to explore problems develops critical thinking skills and can prompt an understanding of the world of others and self in many ways (Amsler 2013).

The way in which individuals gain knowledge and develop skills is influenced by the nature of the learning experience. Individuals can play different roles at different times throughout the learning experience. In this study, staff and students take on the role of expert or novice. In a dynamic system of learning, these roles shift as individuals change in response to the different contexts, the different learning experiences, the changes in the people involved and the way in which they act and interact.

As participants shift from novice to expert, the levels of thinking shift from the cognitive to the metacognitive. The information required to construct knowledge and the skills necessary to do so must be mastered in the first instance. Once this has happened, knowledge is deepened through a metacognitive process, in which the skills mastered are applied to various situations. Activities in which different levels of thinking are demonstrated were sought in the evidence. A novice often requires a transmissive mode of learning in which information leads to skill development. This form of learning is pedagogical. Learning experiences that deliver the information to the learner represents the epistemological position of the program and the educators within it. This position can be examined, reviewed and challenged as the learning becomes more transformative, the knowledge building becomes deeper and meta-cognitive skills are developed.

The modes of interaction reflect the critical decision making within a system (Parsons 1985). In a system of learning, individuals’ awareness of the interactions that take place informs how sense is made of everyday life. Francis and Hester (2004) argued that ‘members of society are able to observe and recognise what is happening around them, and thereby know what they should do to fit their actions together with the actions of others’. Individuals
make sense of their world through passive experience (i.e., wherein the participants mostly observe) and active experience (i.e., wherein participants are engaged and involved).

Different languages are used in learning experiences when experiences are shared and knowledge is transferred from the known-of world to the known world. When discipline-specific language is like-minded, individuals can communicate directly and share experiences. A common language is needed for communication to be meaningful when interaction occurs between different social groups, especially when individuals’ backgrounds and prior experiences differ. This common language can be implicit when meaning is made through passive observation and awareness of other participants. However, understanding may not be as easily gained: interpretations and meaning may differ impeding the transfer of knowledge between the known and self-worlds.

Analysis of these observed interactions enabled the researcher to determine that contribution the actions and decisions make to the learning experience, and how such behaviour influences the meaning that is made of those experiences. When staff and students reflected upon their learning experiences, and became aware of the benefits gained, new understanding of self and others was gained. Sharing this understanding with others in the architectural education program can lead to shift in epistemological position and world view and subsequently, lead to a new way of thinking.
APPENDIX C: ARCHITECTURAL PROGRAMS

This appendix presents the evidence collected and the documentation created for each of the selected architectural education programs. This appendix provides a description of current architectural education practices to explore how a student’s understanding of architecture, its role within the world and how architecture is known can change through learning. The methods used in this thesis adopted a cohesive and comprehensive approach, supported by the organisational framework of the system of learning (discussed in Appendix B). In a system of architectural learning the multiple contexts of learning and the diverse abilities of those participating in architectural education programs are made explicit through evidence documentation. This evidence provides an understanding of the complex process of architectural education and how the core skills of critical thinking, communication and collaboration are learned. The methods of documentation explained in Appendix B have been used to document selected architectural education programs as systems of learning.

Section C.1 of this appendix discusses how global rankings and accreditation procedures focus on the outcomes of architectural education, rather than teaching practices and learning processes within the programs. To identify how architectural education can better support the knowledge building and core skill development discussed in the thesis, current practices in architectural education are examined using these methods of documentation. Six programs were selected based on the ranking systems for architectural education programs (outlined in Chapter 3). The architectural education programs selected were offered at Massachusetts Institute of Technology (MIT); University College London (UCL); Delft University of Technology (TU Delft); Berkeley University of California, Los Angeles (UCLA); Harvard University, and the Southern California Institute of Architecture (SCI-Arc). Additionally, three case studies of transformative experiences have been selected as examples of architectural learning that provide potentially transformative learning experiences as part of their programs. The selected case studies of transformative experiences in architectural learning were offered at the University of South Australia; Auburn University in Alabama, United States; and Victoria University of Wellington, New Zealand. Summaries of each of these programs are presented in Section C.1. These summaries include the evidence of the epistemological position, the expected abilities of students and the elements of the learning system (i.e., the contexts, the people and the interactions) documented using the methods discussed in Appendix B.

Section C.2 of this appendix discusses the findings that have emerged from the analysis of the documentation of the selected architectural education programs. These
findings explain the nature of the learning experiences in these programs, identifying the similarities and the differences between the programs. These findings have informed the discussion in Chapter 5 of the accompanying thesis, which explores how the core skills are developed in architectural education programs.

C.1 Current Practice in Architectural Education

Global rankings are often used by universities to promote the quality of their higher education programs. One ranking system, the QS TopUniversity Ranking System (2014) assesses four broad areas: research, teaching, professional and international outlook. Highest priority is given to research, based on research outputs of the staff and citations per faculty. Teaching quality is the second priority, assessed using the staff-student ratio. Other criteria include employer reputation (based on a global survey of graduate employers), and the diversity of the learning and teaching community (measured by the proportion of international staff and students). It is acknowledged that the intent of these procedures is to provide a benchmark for comparison and assessment, not to determine what constitutes good pedagogical practice. However, it is unclear how the criteria used to determine rankings, which focus on research, relate to learning experiences within an institution. The criteria do not recognise the role of research in learning experiences, or the role of learning within the profession. Limited integration between research, learning and practice could result in communication skills that are discipline-specific and limit collaborative practices. The assumption that low staff-student ratios, small class sizes and individual supervision is an indication of commitment to good teaching reinforces the expectation of high levels of guidance in architectural education programs. This may limit opportunities for self-directed development and critical self-reflection. The reputation of the program within the profession aligns with a focus on discipline knowledge and the development of discipline-specific technical skills of graduates.

It is recognised that the focus of ranking systems, such as the one described above, are limited to the opinions of faculty and staff. The Graduate Architecture rankings focus on student satisfaction and job potential and the assessment of the programs is undertaken by recent graduates. (Graduate Architecture 2012). Whilst information regarding the methodology of the ranking for selection is not provided by Graduate Architecture, comments made about the top ten programs include curriculum, issues of sustainability, ‘new’ architecture and a well-rounded approach, reflecting students’ desire for current and relevant education. Governance, the number of programs offered, the renown of the program
internationally, quality of alumni and likely return on investment were seen as positive attributes, especially when considering future employment. The design of the faculty spaces and the campus and city beyond also received mention, implying that the role of the surrounding built environment is an important consideration.

Accreditation systems also consider the outcomes of architectural education programs and examine the demonstration of key skills and capabilities. In Australasia, the accreditation process examines the content and structure of the program, the facilities in which the programs are conducted, the outcomes produced by students, staff profiles and student satisfaction (Architects Accreditation Council of Australia 2015). In doing so, evidence of the application of communication and collaborative skills is assessed. Meetings with staff and students are used to gauge the nature of the experiences within the program and identify evidence of critical and collaborative practices. However, the accreditation process is used not as a determination of best practice, but as an assessment of minimum professional requirements. The skills of critical reflection, communication and collaboration are embedded within the criteria; these are employed by students to produce the outcomes examined. The way in which these skills are learned, and the experiences in which they are developed, is not explicitly addressed.

In Appendix A, the role of epistemological positioning and world views held by those involved in the education programs were discussed. Different approaches to learning can make explicit the development of the core skills of critical thinking, communication and collaboration. The understanding gained and knowledge built through learning can prompt transformation when it is learned in circumstances that are uncomfortable or challenging, within environments that are diverse. Additionally, learning must be supported by the connections between the people involved. However, the explicit teaching of the core skills, the epistemological positioning of the program and the nature of the learning experiences are difficult to recognise and document using traditional methods of benchmarking, global ranking and accreditation. The methods discussed in this thesis expand upon the approaches used in the current assessment methods of architectural education practices.

Appendix B describes the methods used to document architectural education as a system of learning. These methods, when applied to selected architectural programs, document this expanded assessment of the programs. The composition of the built environment – the natural, residential and commercial, civic and education areas – are documented by mapping the broader physical context within a 1km radius walkable catchment area. The hierarchy of the four contexts of learning is determined by the academic structure of the university, the accommodation options available, and references to the built environment
as a learning resource, and access to the natural environment. The size and composition of the student and staff ratio is used to determine the ration of student, illustrated by unfilled circles, to staff, illustrated with solid circles. The diversity of the staff is illustrated using dark blue for full time staff, and light blue for part time and visiting staff. The size of the circle is relative to the number of students and staff. The role of staff, students and community in learning activities is defined as either novices or experts. The composition of the taught curriculum and the areas in which staff teach illustrates the interactions that take place within the learning experiences. The epistemological position of the learning experiences are documented by identifying the extent to which the activities that contribute to development of knowledge and formation of world view. The criterion for eligibility to enter architecture education programs is documented to illustrate the assumed skills and abilities of students and identify diversity or consistency within a student cohort. The learning process is documented using evidence of the visible outcomes of the programs.

Six programs (listed in Table 7) were selected as examples of current practice in architectural education, based on the ranking systems for architectural education programs. In 2014, when this study was conducted, the top five programs in architecture, as ranked by QS TopUniversities, were those offered at Massachusetts Institute of Technology (MIT); University College London (UCL); Delft University of Technology (TU Delft); Berkeley University of California, Los Angeles (UCLA); and Harvard University. Since 2014, the rankings have continued to indicate that these same programs remain the top five. The architectural education program at the Southern California Institute of Architecture (SCI-Arc) was the highest ranked program by Graduate Architecture in 2012. Summaries of each of these programs are presented along with additional details, maps and diagrams in Sections C.1.1–C.1.9.

<table>
<thead>
<tr>
<th>Faculty/School</th>
<th>University</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Architecture &amp; Planning</td>
<td>Massachusetts Institute of Technology</td>
<td>Cambridge, Massachusetts, United States of America</td>
</tr>
<tr>
<td>Bartlett School of Architecture</td>
<td>University College London</td>
<td>London, United Kingdom</td>
</tr>
<tr>
<td>Department of Architecture</td>
<td>Delft University of Technology</td>
<td>Delft, Netherlands</td>
</tr>
<tr>
<td>Department of Architecture</td>
<td>University of California</td>
<td>Berkeley California, United States of America</td>
</tr>
<tr>
<td>Graduate School of Design</td>
<td>Harvard University</td>
<td>Cambridge, Massachusetts United States of America</td>
</tr>
<tr>
<td>Southern California Institute of Architecture</td>
<td></td>
<td>Los Angeles, California, United States of America</td>
</tr>
</tbody>
</table>

Source: TopUniversities (2014) and Graduate Architecture (2012)
In addition to these examples of architectural education, case studies of transformative experiences (listed in Table 8) have been selected as examples of the systems of architectural learning that provide potentially transformative learning experiences as part of their programs. They are discussed here as a means of looking for the learning experiences that prompt, support and sustain change. The case studies programs have been identified as ones that focus on different aspects of the relationships between the elements, such as the effect of the University of South Australia’s focus on sustainable development on new developments in Adelaide; the impact of the architecture program and building performance research at Victoria University on local architectural practice; and the social outcomes of the projects completed for Rural Studio. While each of the programs differs in terms of situations and focus, they have all continued to be successful after significant periods of operation. In addition, the case study programs have had significant influence within their broader contexts and have been catalysts for long-term change.

Table 8: Selected Case Studies of Architectural Learning.

<table>
<thead>
<tr>
<th>Faculty / School</th>
<th>University</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Architecture and Design</td>
<td>University of South Australia</td>
<td>Adelaide, South Australia, Australia</td>
</tr>
<tr>
<td>College of Architecture, Design and Construction</td>
<td>Auburn University</td>
<td>Auburn, Alabama, United States of America</td>
</tr>
<tr>
<td>School of Art and Design</td>
<td>Victoria University of Wellington</td>
<td>Wellington, New Zealand</td>
</tr>
</tbody>
</table>

Source: author’s own (2012).

The information collected for each of the programs typically includes descriptions and photographs of student and community events, publications by staff and students, project work and research, and information made available to prospective students (e.g., subject descriptions, course outlines and specific unit details). The photographs indicated not only the specific student or staff activity, but also the environments in which the activities took place. While some examples showed activities that were part of the learning process, most concentrated or related to the presentation of learning outcomes, usually for assessment. At the time of the survey of information, the data cited in the following summaries were provided by the relative institutions and available online. As this information was collected in 2015, it is recognised that some of the statistics and data may have changed. This is not considered critical to this study. Data concerning one architectural education program have been examined in relation to the data regarding the other programs, during the same period. Where specific data (e.g., numbers of staff and students) have been referred to, it is not the scale of the cohorts and community alone that is significant, but the comparative size of these cohorts
in relation to other social groups within the architectural program or evident in other programs.

It is noted that all six programs are accredited by their national bodies, and the three countries in which these programs are run—the United States of America (USA), Netherlands and the United Kingdom (UK)—are all members of the International Union of Architects (UIA). Therefore, there is similarity or consistency in the structure and content of the programs. All comprise two programs, an undergraduate (bachelor) program and a postgraduate (masters by coursework) program, which are foundational entry requirements into the profession. The minimum length of study is five years. Following graduation an internship or time spent in practice is required, after which registration as an architect is possible. However, this analysis seeks to better understand the learning experience in these programs. The documentation created in this study extends beyond that used for accreditation and benchmarking as this study assesses for the evidence that transformation has occurred and core skills have been learned.
C.1.1 School of Architecture and Planning, Massachusetts Institute of Technology

**Contexts.** The Department of Architecture is one of five divisions within the School of Architecture and Planning at the Massachusetts Institute of Technology (MIT) (Massachusetts Institute of Technology 2015). MIT offers the Bachelor of Science in Architecture and the Master of Architecture as the accredited pathway to professional registration. Departmental administration, resource centres and classrooms are housed in several buildings within the centre of the campus (in red, Figure 33a). The campus is alongside the Charles River, near the centre of Massachusetts. Approximately 70 per cent of MIT students live on campus. It is assumed that this ratio is similar for the Department of Architecture.

**People.** Within the Department of Architecture, there were 39 teaching staff, and 10 visiting teaching staff (see Figure 34). Some staff were academics (i.e., active in research), others were practitioners. There were approximately 300 students within the department, although more precise enrolment figures for the professional program were not available.

**Interaction.** Architectural design is the core of the MIT programs (see Figure 35a). All students must complete a master’s thesis in their final semester of study. Most classes across all five of the discipline areas are taught on campus and usually the same types of classes are held in the same or similar rooms. Typically, design classes are held in a studio, lectures are in dedicated theatres and tutorials are in smaller rooms. All staff teach within a single subject area of the curriculum. The highest number of staff teach design studies (see Figure 35b).

**Epistemology.** Within both the undergraduate and postgraduate programs there are units that offer students a choice of project and design focus. International workshops and site visits are integrated into some units. Typically these visits are short (i.e., up to two weeks) (see Figure 36).

**Assumed Skills.** To be eligible for the Master of Architecture program students must demonstrate sufficient levels of academic skill (e.g., previous relevant degrees), satisfactory mathematics and scientific proficiency and a minimum standard of English. The application process requires submission of a statement of objectives and a portfolio (see Figure 37).

**Learning Process.** Staff and students contribute to publications and exhibitions. Progress of learning is visible through regular critiquing sessions and exhibited work. It is assumed that this is most typical for the design-focused work. There is evidence of some group learning, demonstrated by students’ work on related projects. Additionally, many of the publications available have two or more authors listed (see Figure 38). It is evident that students and members of the professional community who teach in the programs are encouraged to share their research and expertise beyond the formal classroom (see Figure 39).
(a) Walkable Catchment Map

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

Figure 33: The Multiple Contexts of the School of Architecture and Planning, MIT

Sources: Google Maps (2015c), Massachusetts Institute of Technology (2015).
(a) Staff-student Population.

<table>
<thead>
<tr>
<th></th>
<th>Staff/Student Ratio</th>
<th>Average 1:6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Staff</td>
<td>39 Faculty, 10 Visiting (49 in Total)</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>Approximately 300</td>
<td></td>
</tr>
</tbody>
</table>

*external practitioners as staff also

(b) the Roles of Novice and Expert.

Figure 34: The People Involved and their Roles, Department of Architecture, MIT

Source: Massachusetts Institute of Technology (2015).

(a) Taught Curriculum: Undergraduate (left) and Postgraduate Programs (right).

(b) Allocation of Staff to Subject Areas

Figure 35: Interactions within Architecture Programs, MIT

Source: Massachusetts Institute of Technology (2015).
Figure 36: Epistemological Positioning of Architectural Learning Activities, MIT

Source: Massachusetts Institute of Technology (2015).

Figure 37: Assumed Skills: Master of Architecture, MIT

Source: Massachusetts Institute of Technology (2015).

Figure 38: Visibility of Architectural Learning Processes, MIT

Source: Massachusetts Institute of Technology (2015).

Figure 39: Buildings as Teaching Tool—Architectural Language, MIT

77 Massachusetts Avenue, Cambridge, MA

Source: Massachusetts Institute of Technology (2015).
C.1.2 Bartlett School of Architecture, University College London

**Contexts.** The School of Architecture is one of 13 schools and centres at The Bartlett Faculty of the Built Environment, University College London (UCL). The other departments include Construction and Project Management; Planning; Advanced Spatial Analysis; five research institutes and The Bartlett Space Syntax Laboratory (University College London 2015). UCL offers the Bachelor of Science in Architecture and the Master of Architecture as the accredited pathway to professional registration. Other courses focus on architectural history, digital theory, and architectural computation. At the time of the study, the school was being temporarily housed while permanent accommodation at the edge of the inner London UCL campus, Wates House, was being refurbished and extended (in red, Figure 40a). There are several residences close to the UCL campus, located in the centre of London, and the surrounding urban fabric comprises mixed-use commercial and residential development.

**People.** In the School of Architecture there were 31 full-time faculty staff, some of whom were also active in the profession (i.e., practitioners). In addition, there were 11 visiting teaching staff. There were approximately 450 students within the school (see Figure 41).

**Interaction.** The program is centred on design studies (see Figure 42a). The Master of Architecture program culminates in an architectural thesis. The focus of the architecture program is determined by the research focus of the teaching staff. Formal learning activities were held within the school’s dedicated building. The refurbishment of Wates House will provide social areas, exhibition spaces and workshops in addition to formal learning spaces. Typically, design classes are typically held in studios. Most staff teach within a single subject area of the curriculum (see Figure 42b). Many of staff in the subject areas of design, cultural and applied studies were part time.

**Epistemology.** Students select from units offered within the architectural course. Within the master’s program the students are encouraged to make their choice of studio based on their own professional interests and direction. Summer schools and short courses are offered along with additional professional development courses (see Figure 43).

**Assumed Skills.** In addition to demonstrating certain levels of academic skill, applicants for the master’s program submit a portfolio and explain their reasons for application (see Figure 44).

**Learning Process.** Both teaching staff and students publish and exhibit the work undertaken as part of the architectural education program. Staff who are practitioners explicitly refer to their professional practice to inform and support teaching (see Figure 45). Additionally, learning activities are shared with the broader community through conferences, open critiquing sessions and public lecture series (see Figure 46).
(a) Walkable Catchment Map

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right)

Figure 40: The Multiple Contexts of the Bartlett School of Architecture, UCL

Sources: Google Maps (2015f), University College London (2015).
(a) Staff-student Population.

<table>
<thead>
<tr>
<th>NOVICE</th>
<th>staff</th>
<th>student</th>
<th>community</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPERT</td>
<td>staff</td>
<td>student</td>
<td>community</td>
</tr>
</tbody>
</table>

Figure 41: The People Involved and their Roles, Bartlett School of Architecture, UCL.


(b) the Role of Novice and Expert.

Figure 41: The People Involved and their Roles, Bartlett School of Architecture, UCL.


(a) Taught Curriculum: Bachelor of Science in Architecture (left), Master of Architecture (right).

(b) Allocation of Staff to Subject Area.

Figure 42: Interactions within Architecture Programs, UCL.

Figure 43: Epistemological Positioning of Architectural Learning Activities, UCL

Source: University College London (2015)

Figure 44: Assumed Skills: Master of Architecture, UCL.


Figure 45: Visibility of Architectural Learning Processes, UCL.


Figure 46: Buildings as Teaching Tool—Design Strategies, UCL
22 Gordon Street (formerly Wates House), London, UK

C.1.3 Department of Architecture, Delft University of Technology

**Contexts.** The Department of Architecture is one of five departments in the Faculty of Architecture and the Built Environment at Delft University of Technology (TU Delft). The other disciplines include Architectural Engineering and Technology; Research for the Built Environment; Urbanism; and Management in the Built Environment (Delft University of Technology 2015). TU Delft offers the Bachelor of Architecture, Urbanism and Building Sciences and the Master of Science (Architecture) as the accredited pathway to professional registration. The faculty is housed in a building known as BK City wherein most classes for the professional architecture program are held (in red, Figure 47a). BK City is located on the edge of the TU Delft campus, adjacent to residential and commercial developments and public open spaces. Delft is considered a student city, with accommodation near the campus.

**People.** Within the Department of Architecture, there was the equivalent of 70 full-time teaching staff. The actual staff count is around 160 part-time lecturers and tutors, many of whom also practice professionally. There are approximately 1,000 students within the Department, although not all study in the professional architectural program (see Figure 48a).

**Interaction.** The bachelor and master’s programs offer a well-distributed range of subject areas, although the master’s program is more focused on design studies (see Figure 49a). The architecture track in the master’s program offers a selection of research and design studios, as well as electives. Within BK City, workshops, social and meeting spaces, presentation rooms and dedicated studios are provided. There is cross-curricular teaching, yet most staff teach within a single subject area of the curriculum. The highest number of staff teach in the Cultural and Design subject areas (see Figure 49b).

**Epistemology.** Students select from a choice of studios and electives throughout the courses. The focus of the studios is informed by the research and professional practices of staff. Some of the options available include summer programs and study tours (see Figure 50).

**Assumed Skills** The bachelor program is taught in Dutch, and the master’s program is taught in English. To be eligible for the Master of Architecture program students must complete a bridging program if they are Dutch students from a non-architectural background. Non-Dutch students must provide a portfolio, which is assessed on design and technological abilities (see Figure 51).

**Learning Processes.** Students participate in end of semester exhibitions, which are also published. Staff participate in conferences and public exhibitions, often centred around their area of teaching, research and practice. Public workshops, lecture series and international excursions are integrated with the architectural education program (see Figure 52).
(a) Walkable Catchment Map.

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

Figure 47: The Multiple Contexts of the School of Architecture and Planning, TU Delft

(a) Staff-student Population.

<table>
<thead>
<tr>
<th>NOVICE</th>
<th>EXPERT</th>
</tr>
</thead>
<tbody>
<tr>
<td>staff</td>
<td>staff</td>
</tr>
<tr>
<td>student</td>
<td>student</td>
</tr>
<tr>
<td></td>
<td>community</td>
</tr>
</tbody>
</table>

(b) The Roles of Novice and Expert.

Figure 48: The People Involved and their Roles, Department of Architecture, TU Delft

Source: Delft University of Technology (2015).

(a) Taught Curriculum: Bachelor of Architecture (left), Master of Science (Architecture) (right).

(b) Allocation of Staff to Subject Areas

Figure 49: Interactions within Architecture Programs, TU Delft

Source: Delft University of Technology (2015).
Figure 50: Epistemological Positioning of Architectural Learning Activities, TU Delft

Source: Delft University of Technology (2015).

Figure 51: Assumed Skills: Master of Architecture, TU Delft

Source: Delft University of Technology (2015).

Figure 52: Visibility of Architectural Learning Processes, TU Delft.

Source: Delft University of Technology (2015).

Figure 53: Buildings as Teaching Tool—Construction, TU Delft

Building 8, Julianalaan 134, Delft, Netherlands

Source: Delft University of Technology (2015).
C.1.4 Department of Architecture, Berkeley University of California

**Contexts.** The Department of Architecture is one of three departments in the College of Environmental Design (CED) at Berkley University of California (UCLA). The other disciplines include city and regional planning, and landscape architecture and environmental planning. UCLA offers the Bachelor of Arts (Architecture) and the Master of Architecture as the accredited pathway to professional registration (Berkeley University of California 2015). The CED is housed in Wurster Hall, located within the UCLA Berkley campus (see Figure 54). The campus is surrounded by suburban housing and many of the students live within 5–10 minutes from campus.

**People.** Within the Department of Architecture, there were 31 full-time staff, and over 50 part-time staff. There were approximately 500 students within the department, although not all studied in the professional architectural program (see Figure 55).

**Interaction.** While architectural design is the core of the program, technology, history and visual studies are also well-represented in the curriculum (Figure 56a). Most classes are taught at Wurster Hall in studios, dedicated lecture theatres, and tutorial rooms. Most staff teach within a single subject area of the curriculum. Staff who teach in more than one subject area typically teach design and cultural studies (see Figure 56b)

**Epistemology.** Within both the undergraduate and postgraduate programs students are offered a choice of electives and options available within studios. In the Bachelor of Arts program, minors are offered in Sustainable Design, Social and Cultural Factors, History and Environmental Design and Urbanism. A Master of Arts in design is also available. Additionally, summer programs are offered (see Figure 57). There is a strong interdisciplinary approach supported by visiting practitioners and academics. An active and positive studio culture is well-documented.

**Assumed Skills.** To be eligible for the Master of Architecture program students must complete given mathematics and physics courses. There are several entry pathways, based on previous relevant degrees. The application process requires submission of a folio focused on design and visual communication skills (see Figure 58).

**Learning Processes.** Staff and students participate in the publication, exhibitions, lecture series and public events of the department. There is evidence of staff and student success in local, national and internal competitions on the CED website. Public events, which focus on projects as part of the curriculum, and exhibitions of research and student folios are held in Wurster Hall (see Figure 59). Many of the learning experiences showcased are collaborative, involving staff, students and practitioners (see Figure 60).
(a) Walkable Catchment Map.

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

Figure 54: the Multiple Contexts of Learning, Department of Architecture, UCLA

Source: Google Maps (2015g), Berkeley University of California (2015).
(a) Staff-student Population.

<table>
<thead>
<tr>
<th></th>
<th>Staff/Student Ratio</th>
<th>Average 1:5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Staff</td>
<td>83 staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(26 Emeritus, 22 professors)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(11 associate professors, 4 visiting)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(20 lecturers)</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor program - 300+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Master program - 80</td>
<td></td>
</tr>
</tbody>
</table>

(b) the Roles of Novice and Expert.

Figure 55: The People Involved and their Roles, Department of Architecture, UCLA


(a) Taught Curriculum: Bachelor of Arts (Architecture) (left), Master of Architecture (right).

(b) Allocation of Staff to Subject Areas

Figure 56: Interactions within Architecture Programs, UCLA

Figure 57: Epistemological Positioning of Architectural Learning Activities, UCLA

Figure 58: Assumed Skills: Master of Architecture, UCLA

Figure 59: Visibility of Architectural Learning Processes, UCLA

Figure 60: Building as Teaching Tool—Architectural Learning, UCLA
Wurster Hall, the University of California Berkley.
C.1.5 Graduate School of Design, Harvard University

**Contexts.** The Department of Architecture is one of three departments in the Graduate School of Design (GSD) at Harvard University. The other disciplines include landscape architecture and urban planning and design. Harvard University offers the Master of Architecture 1 and 2 as the accredited pathway to professional registration. The GSD does not offer an undergraduate program. The GSD is housed within Gund Hall, located on the Harvard University campus, in the university town of Cambridge, Massachusetts (see, Figure 61). Most students live within the town, in apartments or university-owned dorms.

**People.** There were 46 full-time faculty staff in the Department of Architecture, although over 100 were listed on the staff directory (see Figure 62a). Some staff listed were external to the department, teaching off campus or in aligned non architectural programs. There are approximately 250 students in both the Master of Architecture 1 and 2 programs.

**Interaction.** Architectural design is the core of the master’s programs. For those from a non-architectural background, the programs include classes across all subjects. For those with an architectural graduate degree, the programs focus on research in technology and culture (see Figure 63a). All students complete a thesis in their final semester. Most classes are taught in Gund Hall, arranged in cross-disciplinary ‘trays’ or tiers of open space (Harvard University 2015). Most staff teach within a single subject area of the curriculum. Staff who teach in more than one subject area typically teach Design and Cultural Studies (see Figure 63b).

**Epistemology.** Electives are offered within the master’s programs, aligned with other learning activities. External programs are embedded in communities. For example, the Studio Abroad program is conducted in conjunction with high-profile international practices (see Figure 64).

**Assumed Skills.** There are multiple entry pathways into the architectural program, all requiring completion of undergraduate study within the design profession. Applicants for the Master programs come from different backgrounds, and admission requirements vary depending on architectural background. To be eligible for the Master of Architecture programs all students must have completed prerequisite study in mathematics, physics, and the history of architecture (see Figure 65). For those from a non-architectural background, completion of a digital media skills workshop is also required.

**Learning Processes.** Staff and students contribute to publications, exhibitions, and conferences within the school, and visiting practitioners of give public lectures at the school (see Figure 66). Final reviews of the core studios are held in the common gallery in Gund Hall (see Figure 67). Workshops to develop visual communications skills are available outside of formal learning activities.
(a) Walkable Catchment Map.

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

Figure 61: the Multiple Contexts of Learning, Graduate School of Design, Harvard University

(a) Staff-student Population.

<table>
<thead>
<tr>
<th>NOVICE</th>
<th>staff</th>
<th>student</th>
<th>community</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPERT</td>
<td>staff</td>
<td>student</td>
<td>community</td>
</tr>
</tbody>
</table>

(b) The Roles of Novice and Expert.

*Figure 62: The People Involved and their Roles, Department of Architecture, Harvard.*


(a) Taught Curriculum: Master of Architecture: non pre-professional (left), pre-professional (right).

(b) Allocation of Staff to Subject Areas

*Figure 63: Interactions within Architecture Programs, Harvard*

Figure 64: Epistemological Positioning of Architectural Learning Activities, Harvard


Figure 65: Assumed Skills: Master of Architecture, Harvard


Figure 66: Visibility of Architectural Learning Processes, Harvard.


Figure 67: Buildings as Teaching Tool—Architectural Language and Learning, Harvard
Gund Hall, Harvard University

C.1.6 Southern California Institute of Architecture, Los Angeles

**Contexts.** The Southern California Institute of Architecture (SCI-Arc) is an independent institution and as such, is not aligned with a university (Southern California Institute of Architecture 2015). SCI-Arc offers the Bachelor of Architecture and two Master of Architecture programs as the accredited pathways to professional registration. Other postgraduate degrees are offered in architectural technologies, design of cities, fiction and entertainment, and design theory and pedagogy. SCI-Arc is located in a dedicated building in the arts district of downtown Los Angeles (see Figure 68a). Most of the students live nearby in independent housing.

**People.** There were 31 full-time staff members, and over 50 part-time staff teaching in the SCI-Arc program (see Figure 69a). Many of the part-time staff were practitioners. Additionally, there were 10 visiting teaching staff members. There were approximately 500 students within SCI-Arc although not all were studying in the professional program.

**Interaction.** A third of the program is taught within the design subject area and the other subjects areas are well-distributed throughout the undergraduate and graduate curricula (see Figure 70a). All classes are taught within the SCI-Arc building which also houses the fabrication and model-making laboratories, gallery spaces, and the architecture library. Most staff teach within a single subject area of the curriculum with the highest proportion teaching in Design Studies. Staff who teach in more than one subject area typically focus on Design and Visual Studies (see Figure 70b).

**Epistemology.** Over 10 per cent of the programs are offered as electives and a variety of studios are also offered. SCI-Arc has several international partners, exchange programs are possible (see Figure 71).

**Assumed Skills.** To be eligible for the Master of Architecture program, students must demonstrate given levels of academic skill (e.g., previous relevant degrees), satisfactory mathematical and scientific proficiency and a minimum standard of written and spoken English. The application process requires submission of a statement of objectives and a portfolio of work (see Figure 72).

**Learning Processes.** Staff and students actively contribute to publication and exhibitions. In-house publications include a magazine showcasing events and news, an academic journal and book publication. There is a focus on a diversity of pedagogical approaches, including study tours and design-build projects (see Figure 73). SCI-Arc staff and students have participated in activities external to their program (e.g., the Solar Decathlon and Habitat for Humanity Los Angeles housing projects) as part of their learning experiences (see Figure 74).
(a) Walkable Catchment Map.

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

Figure 68: The Multiple Contexts of the Southern California Institute of Architecture

(a) Staff-student Population.

(b) the Roles of Novice and Expert.

Figure 69: The People Involved and their Roles, SCI-Arc.


(a) Taught Curriculum: Bachelor of Architecture (left) and Master of Architecture (right).

(b) Allocation of Staff to Subject Areas.

Figure 70: Interactions within Architecture Programs, SCI-Arc.

**Figure 71: Epistemological Positioning of Architectural Learning Activities, SCI-Arc.**


**Figure 72: Assumed Skills: Master of Architecture, SCI-Arc.**


**Figure 73: Visibility of Architectural Learning Processes, SCI-Arc.**


**Figure 74: Building as Teaching Tool—Architectural Learning, SCI-Arc. 960 E 3rd Street, Los Angeles.**

C.1.7 School of Architecture and Design, University of South Australia

Contexts. The Master of Sustainable Design program partners with the architecture program in the School of Architecture and Design at University of South Australia. While the Master of Sustainable Design is not an accredited pathway to professional registration, the program overlaps with the accredited courses in architecture and other aligned disciplines. The school is located in the City West campus of the University of South Australia in Adelaide (see Figure 75). The surrounding urban area, the arts precinct of Adelaide, is mixed use: predominately residential and commercial. The School of Architecture and Design is housed within the Kaurna Building, as a ‘place for learning architecture’ (John Wardle Architects 2015). It is not clearly stated in the information available online where students reside, although evidence of students living close to campus was observed during the visit.

People. Within the Department of Architecture, there were 14 teaching staff, and eight adjunct or research staff (see Figure 76a). There were 350 students within the school, although more precise enrolment figures for the Master of Sustainable Design were not available.

Interaction. The Master in Sustainable Design takes an interdisciplinary approach, focused on theory and practice. The program combines theory-based courses with design studio projects and specialist electives from across the university (see Figure 77a). Most staff teach within a single subject area of the curriculum. Staff who teach in more than one subject area typically focus on Design and Cultural Studies (see Figure 77b).

Epistemology. A broad approach is taken to sustainability encompassing the environmental impact of the design of objects, buildings and systems within social, environmental and economic contexts. Students develop knowledge and expertise, through the selection of a specific discipline or subject areas, design research projects and electives (see Figure 78).

Assumed skills. As the Master of Sustainable Design is not accredited, the career pathways for graduates differ from those in architectural programs. As students typically have completed a bachelor degree in architecture, interior architecture, industrial design, or in an associated discipline, the assumed skills are similar (see Figure 79).

Learning Processes. The design of the Kaurna Building integrates sustainable construction, structure, and services (see Figure 81). Communal academic workspaces are highly visible from one of main streets in the precinct, exposing the teaching and research activities to the public. The campus at Mawson Lakes, houses several research centres and it is possible for students to select electives taught on this campus (e.g., environmental science). Many of the spaces shared with the broader community (University of South Australia 2015) demonstrate sustainable design strategies.
(a) Walkable Catchment Map.

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

Figure 75: The Multiple Contexts of the School of Architecture and Design, University of South Australia.

Source: (Google Maps 2015e), University of South Australia (2016).
(a) Staff-student Population.

(b) the Roles of Novice and Expert.

Figure 76: The People Involved and their Roles, School of Architecture and Design, University of South Australia.

Source: University of South Australia (2016).

(a) Taught Curriculum: Bachelor of Architecture (left), the Master of Sustainable Design (right).

(b) Allocation of Staff to Subject Areas

Figure 77: Interactions within the Sustainable Design Program, University of South Australia.

Source: University of South Australia (2016).
Figure 78: Epistemological Positioning of Learning Activities, Master of Sustainable Design, University of South Australia.

Source: University of South Australia (2016).

Figure 79: Assumed Skills: Master of Sustainable Design, University of South Australia.

Source: University of South Australia (2016).

Figure 80: Visibility of the Learning Process, Master of Sustainable Design, University of South Australia.

Source: University of South Australia (2016).

Figure 81: Buildings as Teaching Tool—Design Strategies, University of South Australia
The Kaurna Building, University of South Australia

Photos: author’s own (2012).
C.1.8 College of Architecture, Design and Construction, Auburn University

**Contexts.** The School of Architecture is one of three schools in the College of Architecture, Design and Construction at Auburn University. Other disciplines include interior architecture, building science, and industrial and graphic design. The five-year Bachelor of Architecture is the accredited pathway to professional registration. The architecture program is taught on the main campus in Auburn, a university town (see Figure 82). Most students live on campus.

**People.** Within the School of Architecture, there were 19 teaching staff, and eight adjunct staff. There were approximately 250 students within the architecture program (Figure 84a).

**Learning Processes.** At the School of Architecture staff and students contribute to publications and exhibitions. Progress of learning is visible through regular critiquing sessions and exhibited work (see Figure 85). Additionally, the elective programs have strong connections with the profession and other community groups.

*Figure 82: The Walkable Catchment Map of the School of Architecture, Auburn University*

*Source: Google Maps, (2016b)*
(a) Land Use in Walkable Catchment Area (left) and (b) Hierarchy of Contexts (right).

Figure 83: The Multiple Contexts of the School of Architecture, Auburn University

Source: Google Maps, (2016b), Auburn University, (2016)

(a) Staff-student Population.

Figure 84: The People Involved and their Roles, School of Architecture Auburn University.

Source: Auburn University, (2016).

Figure 85: Visibility of the Architectural Learning Process, Auburn University

Source: Author’s own (2012).

Figure 86: Buildings as Teaching Tool—Architectural Learning, Auburn University

Dudley Hall, College of Architecture, Design and Construction, Auburn University.

Photos: Author’s own (2012)
Rural Studio, Auburn University

**Contexts.** Rural Studio is offered to students in the architecture program as an elective. Third-year students live full-time on the Rural Studio Farm in Newbern, a small rural community, for one semester. Fifth-year students spend their final year developing, designing and constructing an architectural project. Typically these students live in a larger town nearby in rented accommodation.

**People.** In the Rural Studio program seven fulltime staff teach 27 third-year and fifth-year students.

**Interaction.** At CADC, the architecture curriculum is focused on design, supported primarily by technical and culture subject areas. Classes are held on campus, in the School of Architecture facilities, which include studios, traditional class-rooms and a library. As Rural Studio is offered as an elective, it aligns with the curriculum and classes are taught across the subject areas for each year group. All classes are taught in the studio and workshop. Most staff teach within a single subject area of the curriculum, primarily design studies. Staff who teach in more than one subject area typically focus on Design and Cultural Studies. At Rural Studio, the projects are moderately complex in types of material, methods of construction and brief. There is a high level of technical difficulty in both skills and understanding in the projects designed and constructed by the students. To support this experts are invited for a series of intensive workshops typically focussed on the non-design study areas, such as technology.

**Epistemology.** The architecture program has a high proportion of electives of which Rural Studio is one. Other elective programs include a foreign studies program and an urban design centre in the state’s capital city, Birmingham. These elective programs are not held on campus and are focused on community-centred service learning activities. A competitive selection process determines entry into these elective programs.

**Assumed Skills.** To be eligible for the architecture program students must complete pre-architecture first-year studies. Students must demonstrate given levels of academic skill, satisfactory mathematical and scientific proficiency, and a minimum standard of written and spoken English.

**Learning Processes.** At Rural Studio the learning experience is immersive and students are encouraged to engage and participate in community activities. By learning to design, students make architecture alongside and for the community. The program has been in operation for 20 years. The projects designed and built by the students in Newbern and neighbouring towns are easily accessible and highly visible.
Figure 87: The Multiple Contexts of Rural Studio, Newbern.

(a) Staff-student Population.

(b) the Roles of Novice and Expert.

Figure 88: The People Involved and their Roles, Rural Studio

Source: Author’s own (2012).

(a) Taught Curriculum: 3 year undergraduate equivalent (left), 2 year postgraduate equivalent (right).

(b) Allocation of Staff to Subject Areas

Figure 89: Interactions within Architecture Programs at School of Architecture, Auburn University.

Source: Auburn University, (2016).
SUSTAINING LEARNING

Figure 90: Epistemological Positioning of Architectural Learning Activities, Rural Studio
Source: Author’s own (2012)

Figure 91: Assumed Skills: Foundation year required for professional program, School of Architecture, Auburn
Source: Auburn University, (2016)

Figure 92: Visibility of the Architectural Learning Process, Rural Studio
Source: Author’s own (2012).

Figure 93: Building as Teaching Tool—Architectural Learning, Rural Studio
Photos: Author’s own (2012)
C.1.9 School of Architecture, Victoria University of Wellington

**Contexts.** The School of Architecture is one of two Schools in the Faculty of Architecture and Design (FAD) at Victoria University of Wellington (VUW). The school offers the Bachelor of Architectural Studies and the Master of Architecture as the accredited pathway to professional registration. Programs are also offered in building science, interior architecture, and landscape architecture. The Te Aro campus—dedicated to the FAD—is in the centre of Wellington, while the main campus is a 30-minute walk away (see Figure 94). Anecdotal evidence suggested that most architecture students, and some staff members, live close to the Te Aro campus, although in their first year many students lived on the main campus.

**People.** Within the Department of Architecture, there were 29 teaching staff. Other casual teaching staff were practitioners (see Figure 95a). There were between 280 and 350 students in the department, though the specific enrolment figures for the architectural program were not available.

**Interaction.** In the architecture program between 30–36 percent of the curriculum is allocated to both design and the combined environmental and technical subject areas. Over half of the master’s curriculum is within the research subject area (see Figure 96a). The first year of the architecture program is conducted on both the main campus and the Te Aro campus. Typically, design classes and tutorials are held in studio and lectures are held in dedicated theatres. Most staff teach within a single subject area of the curriculum (see Figure 96b).

**Epistemology.** After completion of the common first year, students within the School of Architecture focus on architecture, building science, interior architecture, or landscape, with some units common to all courses. Within each discipline, year groups are allocated dedicated studio space. Core unit classes are held in these spaces (see Figure 97).

**Assumed Skills.** To be eligible for the Master of Architecture program, students must have achieved a certain academic level in core subject areas in their bachelor degrees (Figure 98).

**Learning Processes.** Many of the sites for student projects are close to the campus, connecting students to local communities and environments. This precinct is also the site of many of the projects set for students. Additionally, external projects are used for teaching and research. The Firstlight project, completed by students for the 2011 Solar Decathlon, involved staff teaching across year groups, across curricula and in some cases across courses. Learning outcomes are exhibited formally and informally throughout the Faculty of Architecture and Design building (see Figure 99). All Faculty students share the common exhibition space on the entry level, the resource centre, workshops, lecture theatres and computer laboratories (see Figure 100).
(a) Walkable Catchment Map.

(b) Land Use in Walkable Catchment Area (left) and (c) Hierarchy of Contexts (right).

*Figure 94: The Multiple Contexts of the School of Architecture, VUW*

Section 3.2: Sustaining Learning

APPENDIX C

(a) Staff-student Population.

<table>
<thead>
<tr>
<th>NOVICE</th>
<th>staff</th>
<th>student</th>
<th>community</th>
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<tbody>
<tr>
<td>EXPERT</td>
<td>staff</td>
<td>student</td>
<td>community</td>
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(b) the Roles of Novice and Expert.

Figure 95: The People Involved and their Roles, School of Architecture, VUW

Source: Victoria University of Wellington (2016)

(a) Taught Curriculum: Bachelor of Architectural Studies (left), Master of Architecture (right).

(b) Allocation of Staff to Subject Areas

Figure 96: Interactions within Architecture Programs at School of Architecture, VUW

Source: Victoria University of Wellington (2016)
Figure 97: Epistemological Positioning of Architectural Learning Activities, VUW

Source: Author’s own (2012)

Figure 98: Assumed Skills: Master of Architecture, VUW

Source: Victoria University of Wellington (2016)

Figure 99: Visibility of Architectural Learning Processes, VUW

Source: Victoria University of Wellington (2016)

Figure 100: Building as Teaching Tool—Architectural Learning, VUW
Te Aro Campus, Victoria University of Wellington, New Zealand.

Photos: Author’s own (2012)
C.2 The Nature of Learning in Architectural Education

To identify how architectural education can better support the knowledge building and core skill development discussed in the thesis, current practices in architectural education are examined using the methods of documentation described in Appendix B. The summaries of nine architectural education programs surveyed include the elements of the learning system—the contexts, the people and the interactions—and evidence of the epistemological position, the expected abilities of students and learning processes visible in the information provided online.

This section of this appendix discusses the findings that have emerged from the analysis of the documentation of the selected architectural education programs. These findings explain the nature of the learning experiences in these programs, identifying the similarities the differences between the programs. These findings have informed the discussion in Chapter 5 of the thesis, which explores how the core skills are developed in architectural education programs.

Analysis of the selected architectural education programs indicates that there is a consistency in contexts and the role of the people involved in the programs. This reflects a global system of architectural learning that does not recognise the differences of location nor contextualise the learning. However, some programs differ in noticeable ways when the additional methods of mapping are used to document the interactions that occur within programs, the world view reflected in the learning activities, the assumed skills and abilities of students, and the learning processes visible in the program. The program at UCLA seems to be the most distinctive in terms of interaction and staffing (see Figure 56). Almost equal focus is given to design, culture and electives in the undergraduate program and there are more full-time members of staff than part-time. The trend in other programs is the opposite. For example, the undergraduate program at SCI-Arc has the most evenly distributed curriculum across all subject areas (see Figure 70). The postgraduate program at SCI-Arc has allocated the smallest percentage of the curriculum to the design subject area, one of the highest percentages to research and provides the greatest opportunity for electives. As such, students in the SCI-Arc program have the greatest choice and the capacity to direct their learning. The program at Sci-ARC also has the highest staff–student ratio (see Figure 69), and is located on the most urbanised campus (see Figure 68), with 92 per cent of the surrounding area documented as mixed use. The different learning activities (see Figure 71) within the program at SCI-Arc suggest that the world views and epistemological positions are likely to be diverse.
The program at The Bartlett School of Architecture has the greatest focus on the design subject areas in both programs (see Figure 42). As a result, in the undergraduate program, electives and research are not well-represented. It is assumed that some of the content of the research subject area is embedded within the design units, supported by the strong horizontal integration evident in the program. In the postgraduate course, environmental, professional, visual studies and electives are not represented. This reflects the expectation that the prerequisite bachelor programs provide the necessary skill and ability development for students to do well in the master’s programs.

C.2.1 The Multiple Contexts of Learning

There are several similarities in the contexts of the six architectural education programs surveyed. Typically, the programs are located in urban areas where 60–76 per cent of the building use is residential and commercial. The programs in the USA are typically campus based, often in university towns or precincts, whereas the European programs are located in a range of urban environments. The natural context does not feature significantly in many of the walkable catchment areas documented. However, at MIT, around one third of the area is considered natural, albeit highly moderated, as the campus is located adjacent to the Charles River. As a low percentage of the catchment areas is used for civic purposes, it is inferred that community activities held as part of the architectural education programs take place either within the educational facilities, or more further afield, if at all. The available information about the residential areas within the catchment areas indicates that the type of housing varies from suburban, university owned, and residential college. From this, it is inferred that most students live in close proximity to their learning environments.

While each of the three case studies of architectural learning (i.e., University of South Australia, Rural Studio and VUW) are located in urban environments and the architectural programs are taught in dedicated buildings on campus, the details vary. At VUW, the FAD is in a separate campus, the Te Aro Campus, in the centre of Wellington City, approximately one kilometre from the main campus. At Auburn University, the Rural Studio program is located in a rural area approximately 145 miles (i.e., 233 kilometres) from the main campus in Auburn. At both University of South Australia and VUW, while staff and students live off campus, the cities of Adelaide and Wellington are smaller than the others studied (e.g., Boston, London and Los Angeles). The formal learning activities of all the architectural education programs selected are taught mostly in spaces allocated to their school or faculty. The classes at the University of South Australia are taught in spaces that are shared with other disciplines. At Rural Studio,
most classes are taught in the shared studio spaces. Computer laboratories and the workshop are shared by all students and the common hall is used for community gatherings. At the VUW the studio spaces allocated to each year group are used for tutorials and seminars for all subject areas.

C.2.2 The People Involved and Their Roles

The people involved in the six architectural education programs are accounted for by recording the overall size of the student population, the number of staff and the staff-student ratio. The size of the student population varies in each of the programs, ranging from 300 across the entire program at MIT, to 1,000 in the entire program at Delft. There were 250 students in the architecture program at Harvard, although this is a master’s program only. For most programs, the average staff-student ratios were 1:5 or 1:6. All programs had both full-time and part-time faculty members, with between 30 per cent and 50 per cent of the staff employed part time. Another commonality across the programs was the smaller year groups in the master’s programs. Year groups in the bachelor programs ranged from 60–100 students, whereas in the master’s programs they ranged from 40–120 students, typically two-thirds of the cohort in a bachelor program.

In most of these architectural education programs there was little evidence of cross-curricular teaching. From this, it is inferred that the information delivery and curriculum content in the subject areas is tightly focused, skills and knowledge are subject specific and that the relevancy of the subjects are emphasised in other ways. The use of practitioners and globally recognised architects as staff is likely to increase the relevance of the other subject areas as they discuss their specific knowledge and skills in class and make the relevancy of the content explicit.

In the three case studies of architectural learning the staff-student ratios differs. The highest ratio is evident at University of South Australia (1:25). This program also has a high proportion of sessional staff (55 in a total of 70 staff members), which affects the staff-student ratio. The high numbers of sessional staff suggests that these staff members provide expert, professional and practical expertise. The Rural Studio program has the most concentrated ratio (1:4), although the remainder of the architectural program at Auburn University is more typically taught at 1:9. At Rural Studio, staff are full time and teach primarily in design and visual studies. Guest lecturers supplement the teaching program as they are often experts in their field (e.g., structural engineers) and practising professionals. At VUW most staff are internal and practitioners participate as guests or sessional tutors, providing industry-relevant
content and strong professional connections. The master’s programs in these three case studies of architectural learning have similar sizes of student population. The number of students participating in the Rural Studio program is smaller, although most students take part in the third-year program as it is offered in the fall and spring semesters. However, the year-long master’s thesis program at Rural Studio is limited to 12 students.

C.2.3 Interactions within the Learning Experiences

The documentation of the information surveyed indicated that in the six selected architectural education programs, the design subject area is allocated the highest proportion of the curriculum at both undergraduate and postgraduate levels, although the exact proportion differs. The lowest proportion of the curricula are allocated to environmental studies and visual studies in both undergraduate and postgraduate programs. From this, it is inferred that visual communication skills and environmental literacy and knowledge are assumed, that prior knowledge is expected, or that learning in this area is implicit and embedded elsewhere (e.g., design, research and professional studies). Typically, there is a focus on research in the postgraduate programs, along with the culture topics. While professional studies are present primarily in the postgraduate programs, in some programs (e.g. those at UCL, TU Delft, Harvard and SCI-Arc) professional studies are recognised as a discrete subject area in undergraduate programs.

The curricula of the three case studies of architectural learning also focused on the design subject area, although there were some differences to the examples of architectural education. The Masters of Sustainable Design program at University of South Australia allocates 24 per cent of the curriculum to the technology and science area, more than the other programs. The Master of Architecture program at Auburn University has 24 per cent of the curriculum allocated to electives. The Master of Architecture program at VUW focuses on research, with 57 per cent of the curriculum allocated to this subject area.

C.2.4 Epistemology and World Views

The learning activities in the six architectural education programs have been mapped along the epistemological scale to illustrate the world views held by those within the programs. Each program has a purpose-built (or refurbished) building in which most classes and learning activities take place. Most of the formal teaching occurs in shared spaces, as different units or subjects are taught in the same space. However, two programs, however, have dedicated space for the different subject areas (MIT and UCLA). Many of the shared
spaces are formal lecture theatres, and tutorial rooms or laboratories, which tend to be used for all non-design subject areas.

Cross-curricular teaching was not common in the programs examined, and one program (MIT) had no evidence of cross-curricular teaching. When staff taught in more than one subject area, the most common combinations were the design and culture studies and the design and visual studies. There was no evidence that any staff taught in all four subject areas, although teaching in three subject areas is not unknown (e.g., a single staff member taught across design studies, cultural studies and applied studies). Applied studies (i.e., environmental, science and technical subject areas) is the least likely to be taught by staff teaching across curricula. From this, it is inferred that focused and specific discipline knowledge is required to teach in this subject area. It could also be inferred that these subject areas are most likely to be taught by full-time academic staff actively researching in this area, or practitioners who have a tight focus on the environmental, scientific and technical aspects of professional practice.

Horizontal integration was visible in most programs (i.e., the scale, context or approach of projects in design aligns with the other subject areas) however, it was unlikely that this occurred across all subject areas. Often, it involved the integration of design and only one other subject area, either formally as a co-requisite, or informally.

All programs offered choice to students, either as a discrete electives or options within core units. Many of these electives must be selected from a limited list, usually offered within the architecture program, suggesting that the requirements of accreditation dictate the content of the curriculum and that there is little room to supplement this.

Learning-in-place is common practice in these architectural education programs, although the details (i.e., the number of programs offered, the length of time spent in place, and the nature of these learning activities) vary widely. Most programs included site visits to specific projects. Summer programs were typically offered as immersive learning experiences within the culture or design study areas. In some cases, audio-visual resources, exhibitions and lectures from guests or visiting staff provided alternatives to direct experiences.

The University of South Australia program held a similar epistemological position to that observed in the six architectural education programs, in that the activities were distributed evenly across range of world views. The documentation of the Rural Studio program (e.g., the design-build nature of the program and the cross-curricular projects) suggests an interpretivist focus, although their use of shared spaces provided a more positivistic experience. At VUW the technical and scientific focus and alignment with the building science program within the school demonstrates a positivistic position.
C.2.5 Assumed Skills and Abilities

The entry requirements for the six architectural education programs indicated that certain knowledge is consistently assumed for all programs. Applicants are required to demonstrate academic and spatial abilities, along with written and visual literacy, and numeracy skills. Programs do not require evidence of practical or social abilities, or a demonstration of environmental literacy. Only UCL required an interview in which spoken language ability was assessed.

The formal requirements of the three case studies of architectural learning did not differ from the architectural education programs discussed earlier. No mention was made of students requiring skills or abilities beyond those typically expected. However, the nature of the projects, the opportunity for students to direct these projects and the high levels of community and cross-disciplinary activities suggest that the development of additional non-technical skills is well-supported. The hands-on, practical approach is central to projects in Rural Studio and the Firstlight Project. The collaborative nature of these projects is explicitly stated and students are required to be self-motivated and self-directed. At Rural Studio, this is evident in previous student work, often used as a learning resource by students and staff. At VUW, success in the Solar Decathlon was supported by the strong connection between the architecture and building science programs.

C.2.6 Learning Processes

Typically, the six architectural education programs make the learning within the programs visible regularly. As part of their design studies, students display their work and subsequently review the work of their peers. In other subject areas, outcomes that are more likely to be demonstrated in written form (e.g., reports and essays) are less likely to be exhibited and displayed. Assessment of architectural education programs is mostly individual; however, there are examples of group projects used for teaching and assessment. Additionally, there is evidence that research publications and other academics outputs are co-authored by staff and students. When required to present to others (e.g., to staff within the architecture program, to professionals or to the broader community), students develop skills in multiple languages to communicate complex ideas clearly to diverse groups of people.

Within the three case studies of architectural learning, students are mostly individually assessed and the outcomes are highly visible. Occasionally thesis projects are shared by a small group of students; however, the assessment is individual, as each student focuses on a key area or topic. Similarly, collaboration is evident in staff research (e.g., through co-authorship).
and in professional practice (e.g., when the focus of the practice aligns with topics explored in the student projects). In the Rural Studio and VUW programs the learning process is visible in formal exhibitions in the shared spaces and progress work is displayed in the studios spaces. At Rural Studio, learning is also highly visible in the students’ design-build construction projects, which are often of a public nature and well-publicised. The documentation produced as part of the multi-year projects is passed on to students in subsequent years. As such, a collective resource is developed by the students and shared beyond the immediate learning experience.

This examination of architectural education programs has identified that, to some extent, the architectural education programs are providing the learning experiences that have been called for by theorists discussed in the thesis. The intense nature of the social context—when living, working and learning occur in close proximity—reinforces social connections and fosters collaboration among staff, students, and the professional community. The involvement of practitioners as educators also grounds the learning in real-world practice and supports students’ understanding of others and effective communication skills.

However, despite the change in learning, there seems to be little change in the profession. The practice of architecture remains disconnected from practical everyday life. The hidden curriculum that Dutton (1991, 165-94) identified as reinforcing ideologies, values and assumptions is strengthened by the involvement of elite professionals in teaching. In the data collected in the survey of information made available online by the relevant architectural education programs, it was not clear how the nature of the learning experiences presented in the programs has resulted in the development of core skills and transformation of world view. Therefore, the additional methods of documentation described in Appendix B (i.e., the mapping of contexts over time, recording the influence of individuals’ previous experiences through interviews, and capturing the learning processes through observation) were used to determine whether the development of the core skills required to support transformation have been explicitly taught in these programs.
APPENDIX D: TRANSFORMATIVE ARCHITECTURAL LEARNING

This appendix extends the documentation of selected architectural education programs presented in Appendix C. The documentation presented in this appendix is used to explore how the development of the core skills of critical thinking, communication and collaboration contribute to transformative experiences in architectural learning. The methods of documenting systems of learning discussed in Appendix B have explained how records of the contexts of the programs, the experiences of the people involved and the diverse interactions that take place were created. These methods were used to collect evidence from selected architectural education programs at Massachusetts Institute of Technology (MIT), University College London (UCL), Delft University of Technology (TU Delft), Berkeley University of California (UCLA), Harvard University and Southern California Institute of Architecture (SCI-Arc). Analysis of the evidence has informed the discussion in Chapter 5 of the thesis, wherein the nature of the learning experiences in architectural education that promote the core skills of critical thinking, communication and collaboration are described.

This appendix describes how evidence from selected case studies of architectural learning was collected using additional documentation methods. These case studies were the Sustainable Development program at University of South Australia, Rural Studio at Auburn University, and the Firstlight Project at Victoria University of Wellington (VUW). The multiple contexts of learning were mapped in finer detail. Narratives recorded during meetings with the people involved provided insights regarding the role of staff, students and communities. The activities conducted as part of the architectural learning were observed and the interactions and behaviours that occurred were photographed to account for the relationships and connections between those engaged in these activities, both directly and indirectly. A coding framework of transformative experiences was used to organise the evidence according to the elements of contexts of learning, the types of people involved and the nature of the interactions that occurred within the learning system. The analysis of the evidence collected identified the nature of learning environments in which the development of core skills was supported.

Each of the selected case studies of architectural learning has their own area of focus within the curriculum. At Rural Studio, the focus was the community and development of skills in practice, placing the social context at the forefront of the learning experiences. This commitment to social responsibility was often the driver for project selection and directed the focus of learning activities. This is reflected in the places of learning (e.g., the town of Newbern, Alabama, and the Rural Studio farm) and the built outcomes of the design–build
program (e.g., the design–build projects found throughout Newbern and adjacent areas in Perry County).

The program at VUW focused on the integration of theory and science through real-world demonstration. There was evidence that the strong connection between architectural education and professional communities was supported by the concentrated nature of the community and the physical environment. In the Firstlight Project, the natural context was prioritised and the decisions that were made were based on environmental concerns and values. This environmental responsibility was reflected in the teaching activities of the staff, their research and/or practice, and their expertise in environmental sustainability. The Firstlight Project embedded research into practice and the success of the project at the 2011 Solar Decathlon, in which the energy efficiency and environmental performance of designs are rigorously scrutinised, served as a demonstration of this integration. The program at the University of South Australia also focused on environmental responsibility of the professions and being situated within a diverse urban context provided easy access to professional and social activities. The focus of the Master of Sustainable Design was reflected in the activities of the staff and students. The staff and students were actively engaged in sustainability events and community-focused activities as part of their academic and personal lives.

The survey of information discussed in Appendix B illustrates that for the three case studies of architectural learning, the assumed abilities and skills of those students entering the programs were similar and there were high proportions of practitioners as part-time staff. Epistemologically, there was a difference between the selected architectural education programs studied and the selected case studies of architectural learning. Typically, the case studies of architectural learning offered experiences that supported diverse epistemological positions, from positivist to interpretivist. The selected architectural education programs demonstrated only two or three of the learning activities that represented different epistemological positions, illustrating a more limited range of epistemological diversity. The learning outcomes of the case studies of architectural learning were also different from those of the selected architectural education programs surveyed. At the case studies, the learning outcomes manifested as physical projects in the community, and were often inhabited, making longitudinal feedback on the performance of the design and success of the project possible. At Rural Studio, staff have lived in the community for several years and regular engagement with these communities identified new projects. The Firstlight Project completed by VUW students was exhibited throughout New Zealand following the success at the 2011 Solar Decathlon, during which the design was rigorously tested.
D.1 Conducting Field Work at the Case Studies for Architectural Learning

In this study, the researcher visited each of the selected programs and documented the learning experience of programs using the methods described in Appendix B. Three days were spent visiting the program at the University of South Australia. Two weeks were spent at each of the programs at VUW, New Zealand, and Auburn University, Alabama. At Auburn University, two days were spent at the main campus in Auburn, and 12 days at Newbern, Alabama, where Rural Studio is based.

During the time spent at each of the case studies three smaller studies were conducted. These studies documented the nature of change within these dynamic learning systems, the elements of these systems (i.e., the multiple contexts, the role of people involved, and their interactions) and the nature of learning experiences (i.e., the relationship between the people involved, and the contexts of learning). The documentation included recorded interviews, observations and field notes, audio recordings and photographs. As required by research ethics procedures, the studies were structured and implemented to ensure that those involved were aware of the aim of the research, evidence collection and storage. Students and staff were kept informed of the progress of documentation during the visits. Academic papers that emerged from this study have been sent to staff from the programs involved.

‘Study 1: Managing Change’ focused on understanding how the program has responded to change over time. The intent of this study was to identify and document the role of the leadership team within the learning experience, the nature of the situations in which the change took place, the language (verbal and non-verbal) used to describe the process of change and the change itself. The purpose of this documentation was to gauge individuals’ capacity for change and the capacity for change within the system or institution. The semi structured interviews conducted with staff members at each of the programs took between 45 and 75 minutes each. The individuals spoke at length describing events and situations in their past. There was minimal interaction between the researcher and the person being interviewed beyond the short prompts from the interviewer when required.

The primary focus of ‘Study 2: Observing the Everyday’ was to examine the learning experiences themselves within the program. The aim of this study was to document the role of individuals (e.g., students, staff and members of the community) within the learning experience, the situations in which the learning experiences took place, the language (e.g., verbal and non-verbal) used by individuals when reflecting upon their learning experiences and the modes of interaction that occurred. The original intent of this study was to shadow staff members for two days, observing and recording their usual daily activities. However, once in
the field, it was clear that this approach would be too intrusive. At Rural Studio and VUW the
closeness of the community would have made unbiased observation difficult. However, the
proximity of residences to the learning spaces enabled the researcher to gain a sense of the
everyday activities of staff. Attendance at social events (e.g., the community dinner at Rural
Studio and networking events at VUW) provided sufficient information regarding the nature of
the informal learning experiences. The interview guide used for both Study 1 and Study 2 (see
Table 9) was trialled at University of South Australia. This guide was adapted in response to
feedback received from those interviewed before being used at Rural Studio and VUW.

Table 9: Interview Guide, Study 1 and Study 2

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Prompts</th>
</tr>
</thead>
</table>
| What is the main program that you are involved in at [name of institution]?
Describe your role within this program? | Provide background about myself and the research. I am interested in understanding how our previous experiences have shaped our position and influenced how, where and in what we see meaning. |
| What types of activities does this involve? | |
| Who do you meet as part of these activities? | |
| How do these activities relate to other aspects of your daily life? | |

<table>
<thead>
<tr>
<th>Background</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can you describe what you remember about where you grew up?</td>
<td>Describe where you grew up or spent a large part of your childhood? What age were you then? What did you like the most about growing up? The least? Describe your favourite place. Where was this place? Who else was there?</td>
</tr>
<tr>
<td>What do you remember from your school/education?</td>
<td>Where did it take place? What kind of spaces did you remember? What was your favourite space at school?</td>
</tr>
<tr>
<td>In this context, what does the word environment mean to you?</td>
<td></td>
</tr>
<tr>
<td>At this time of your life, how did you experience this environment? Describe what you remember of the broader context at this time?</td>
<td>Where did this experience take place? How did this experience impact on the environment itself? At what level were you aware of current affairs - political, social, economic? Were they discussed at home, at school, with friends? Was this similar to what the people you grew up with thought or experienced? Your parents? Friends? Others?</td>
</tr>
<tr>
<td>How did this impact on your experiences at the time?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning experiences and influences</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does the word learn mean to you?</td>
<td></td>
</tr>
<tr>
<td>Where do you think your most important learning happened as a child?</td>
<td>How come?</td>
</tr>
<tr>
<td>How do you think your learning experiences as a child have influenced your adult life? How have the situations in which these took place influenced you?</td>
<td>What are the influences in your everyday life? What are the influences in your professional life?</td>
</tr>
<tr>
<td>How do you think learning is experienced as an adult?</td>
<td>Where do you learn as an adult? What do you learn as an adult?</td>
</tr>
</tbody>
</table>
Motivation and Value Orientation

Describe what lead to your role in this program.
What were the experiences that brought you here, kept you here.

How did you come to be in your current role?
What do you see as the primary outcome of your job here?
What do you consider is the main reason why you do this job?

What do you feel are the potential outcomes of the program?
What motivates you to learn (do better) in your professional life?

How do you see your role here as contributing to outcomes of the program?
Are these outcomes short, medium, long term?

What does this mean to you, personally?
What motivates you to continue in this role?
What is it that makes this important?

Identity (self/collective)

Describe what community means to you?
What professional, social groups do you belong to?
What do you feel is important about these groups?
How does it make you feel to be a part of them?

Outside of your professional/teaching activities, what is your role within the community?
How are they aware of this responsibility?
How does this responsibility affect everyday life?
How does this responsibility the life of others in the community?

Who is responsible for this environment?
Who were the drivers of the change?
Who was impacted by the change?
How was the change readily accepted?

Educational program and change

Describe the structure and background of program?
What are the main underlying principles of the program?
How do these relate to those of the university as a whole?

Describe what has changed in the program over the years.
What has prompted this change?
How was this change successful?

How was this change managed?
Who were the drivers of the change?
Who was impacted by the change?
How was the change readily accepted?

What was your role in the change?

And Finally

What are the things you do everyday that you would consider sustainable.

Source: author’s own (2012).

In ‘Study 3: Documenting Learning’, the contexts in which these programs occurred (i.e., those evident in the surrounding physical and social environments), were documented using the methods described in Appendix B. The aim of photographing the learning experiences was to capture the range of formal and informal learning activities. This documentation included photographs capturing the movements and behaviour of people as they moved through a specific place or situation. Behavioural responses to certain situations were recorded by sequences of photographs of repeated actions taking place in different environments. Observing an individual in different situations in this way made the responses to similar situations explicit.
The case studies of architectural learning differed in the structure of the programs, the nature of the learning experiences, and the length of time spent in the field (see Tables 10–12). Therefore, the implementation of the three smaller studies was different in each case.

Table 10: Case Study One Field Work, University of South Australia

<table>
<thead>
<tr>
<th>Principal Learning Experience—Masters of Sustainable Design Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date of Study</strong></td>
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<td></td>
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<tr>
<td><strong>Location</strong></td>
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<td></td>
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<tr>
<td><strong>Participants</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td><strong>Data Collected</strong></td>
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<tr>
<td></td>
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</tbody>
</table>

Source: author’s own (2012).

Table 11: Case Study Two Field Work, Auburn University

<table>
<thead>
<tr>
<th>Principal Learning Experience—Rural Studio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date of Study</strong></td>
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<tr>
<td><strong>Location</strong></td>
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<tr>
<td><strong>Participants</strong></td>
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<tr>
<td><strong>Data Collected</strong></td>
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</tbody>
</table>

Source: author’s own (2012).
### Table 12: Case Study Three Field Work, Victoria University of Wellington

<table>
<thead>
<tr>
<th>Principal Learning Experience—Firstlight Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date of Study</strong></td>
</tr>
<tr>
<td><strong>Location</strong></td>
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<tr>
<td><strong>Participants</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Data Collected</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Study 2: Interviews—Academics B and F, Graduates A, B, and C</td>
</tr>
<tr>
<td>Field notes</td>
</tr>
<tr>
<td>Study 3: Photographs—single snapshots</td>
</tr>
<tr>
<td>Field Notes</td>
</tr>
<tr>
<td>Photographs—single snapshots, repeated single snapshots, panoramas, journey sequences</td>
</tr>
<tr>
<td>Audio recordings of place</td>
</tr>
</tbody>
</table>

Source: author’s own (2012).

The original intent of Study 2 was to interview one person from the programs’ leadership team as well as staff members. At Rural Studio, as access to the program director was difficult due to his teaching and administrative schedule, the associate director was interviewed instead. However, during the visit, informal conversations were held with the program director and the focus of this study and the nature of the Rural Studio program were discussed. I took advantage of opportunities outside of formal teaching times to assist staff members in activities (e.g., completing outstanding building tasks on one of the previous year’s thesis projects). While this did not contribute directly to the collection of evidence, it did serve to build trust with those involved in the research, as it demonstrated my commitment to understanding the program. As this occurred before the interviews with the staff, I acknowledge that this may have affected the interview process, though any affect was seen as positive. When compared to the responses from the University of South Australia staff member, the responses given and narratives told by Rural Studio interviewees are more comprehensive and open.

It was not possible to collect evidence of learning activities at the University of South Australia. Classes were not held as it was mid-year break when I visited. However, it was possible to collect evidence of some of the activities, namely the way in which the spaces were
inhabited by the students, as many of the students’ drawings, equipment and belongings had been left in the studio over the break.

In this thesis, case studies enabled a responsive approach to theory development. Prior to the case study field work, I undertook a pilot exercise to develop field work skills. The insights I gained during this exercise directly informed the methods I employed later in the three case studies. During the observed event, it became apparent that the actions may not be experienced firsthand by an individual, as they may not be physically engaged in the interactions. As such, the elements of the learning experience can be experienced vicariously—that is, they may be experienced by someone in the group and shared with the other group members. I explored this further during the field work, as the sharing of experiences was observed, documented and created.

During the case study field work, the overlapping of analysis and documentation allowed for the alteration and addition of documentation methods in response to situations in the field. As such, I documented the contexts were more accurately, to understand the people involved and examine the interactions that occurred. For example, I first considered the techniques of photograph sequences and panoramas while visiting the University of South Australia and repeated this technique at the subsequent case studies. The informal exhibition of research documentation at Rural Studio informed my installation, Coming Away With ..., at the Go Away Come Back Exhibition (Mackintosh 2013) as methods for sharing experience were explored (see Chapter 4).

**D.2 Identifying the Characteristics of Transformative Experiences**

The documentation methods described in Appendix B enabled both formal and the informal learning experiences to be described. This documentation has made explicit the change that occurred within everyday activities and the effect of formal learning activities on those involved in the programs (i.e., the students, staff and communities) and the broader environmental context. As there are many ways in which learning within and about environments can take place, the evidence collected is not representative of all architectural education experiences. The intent of this thesis is to use the documentation of observed learning experiences as a way of illustrating possibilities, and to inform the development of a framework of transformative experiences in architectural learning.

The elements in a system of transformative learning (described in Chapter 3) have been used to analyse the documentation created and identify similarities and differences between the case studies of architectural learning. The coding framework (see Table 13) has
been used to organise and guide this analysis. Evidence of the explicit or implicit development of core skills of communication, collaboration and critical thinking determines how, and for whom, transformation occurs.

This coding framework of transformative experiences defines the characteristics of the learning experiences that can lead to a shift in world view—the primary measure of transformation. The methods of documenting and recording learning experiences enabled evidence to be collected that accounted for the different situations, events and activities that could support, prompt and sustain transformation. The coding across the different methods of evidence collected ensured consistent interpretation for all forms of documentation. The findings from the evidence collected during the visits to the selected learning experiences are discussed in Chapter 4, in which the events, situations and activities that contain the characteristics of transformative learning experiences are identified. The characteristics identified in the coding framework (see Table 13), have been used to organise and categorise the significant amount of evidence collected. Examples of the evidence (i.e., the maps, photographs, the narratives and the observations) are presented in Tables 15–24 alongside a summary of the analysis. This summary is presented to illustrate the way in which the documentation has informed the findings discussed in Chapters 5 and 6 of the thesis.

---

1 During the field work carried out in 2012, 3,000 photographs were taken, 211 minutes of soundscapes recordings made, and 530 hours of interviews and conversations transcribed.
Table 13: The Coding Framework of Transformative Experiences in Architectural Learning

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Built - demonstrating responsible design</th>
<th>Natural—connecting with nature</th>
<th>Social—supporting interaction</th>
<th>Educational—visible learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTEXTS</td>
<td>Active elements—providing efficient performance</td>
<td>Moderated environments—replacing lost environments</td>
<td>Social groups—providing spaces for people to come together</td>
<td>Learning by doing—experiential learning</td>
</tr>
<tr>
<td></td>
<td>Passive elements—operable—encouraging interaction</td>
<td>Unmoderated environments—conserving native environments</td>
<td>Gathering places—opportunity to come together</td>
<td>Learning experiences—how, who and where</td>
</tr>
<tr>
<td></td>
<td>Boundaries—promoting interaction</td>
<td>Passive elements—fixed—climate responsive design</td>
<td>Learning together</td>
<td>Being-in-place—knowing the world</td>
</tr>
<tr>
<td>PEOPLE</td>
<td>Scale of social groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td></td>
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<tr>
<td></td>
<td>Medium</td>
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<tr>
<td></td>
<td>Large</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complexity of social groups</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Interconnected</td>
<td></td>
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<tr>
<td></td>
<td>Intracommunicated (like-minded)</td>
<td></td>
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<tr>
<td></td>
<td>Isolated/discrete</td>
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<tr>
<td></td>
<td>Benefit of learning</td>
<td></td>
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<tr>
<td></td>
<td>Direct/individual</td>
<td></td>
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<tr>
<td></td>
<td>Reciprocated</td>
<td></td>
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<tr>
<td></td>
<td>Shared</td>
<td></td>
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<tr>
<td></td>
<td>Teaching Practice</td>
<td></td>
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<tr>
<td></td>
<td>Pedagogical—teaching focused</td>
<td></td>
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<tr>
<td></td>
<td>Andragogical—student centred</td>
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<tr>
<td></td>
<td>Critical—adaptive and responsive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTERACTION</td>
<td>Learning Experiences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Roles of individuals—novice/expert</td>
<td></td>
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<tr>
<td></td>
<td>Cognitive process—levels of thinking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modes of learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modes of Interaction</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Passive vs active—those watching and those doing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Understanding via real or virtual experiences</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Between or within social groups</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Active elements ensure the efficient performance of design through the provision of mechanical and automated elements (e.g., solar panels and hot water systems). The use of these elements has increased and they have become part of a common visual language. This was evident in housing design at the sustainable suburb of Mawson Lakes, Adelaide (see Table 14a), and at the Kaurna Building at the University of South Australia (see Table 14h). However, while these elements have become a part of a shared architectural language, the meaning associated with these active elements is diminished as they become more common, their role in climate-responsible design is taken for granted.

Passive elements encourage awareness of the built environment by using design elements that explicitly respond to environment. Examples of effective passive design strategies (e.g., control of daylight through sun shading and optimised orientation, and the control of ventilation through operable windows) were evident in the documentation (see Table 14b and 14f). Typically, for people in these contexts, these strategies bring the built context to the fore and highlight the relationship between the built and the natural contexts. When the passive elements are the only means of becoming comfortable, the discomfort felt through inaction, or inappropriate action over time, prompts action and a change of behaviour. As such, the nature of the built and natural contexts, the language used and an individual’s awareness of the performance of the contexts are critical. Correct action relies on individuals’ architectural and environmental literacy, and an understanding of the relationship between the built and natural contexts. The elements that are most often adjusted (e.g., windows and operable shades) are easily recognisable, but limited environmental literacy may affect the use of these elements. In situations in which the power required for active elements is not available, reliance on passive elements is increased and awareness and literacy can be developed. This is evident in programs such as the University of South Australia’s Design for Social Innovation and Sustainability Laboratory (DESIS Lab) and Design and Construct (see Table 14c and 14d), wherein projects were constructed for remote communities in extreme conditions.

Interaction between contexts is more likely when the boundaries are porous and perforated. When light, sound, air and people can easily move from one side to the other, the situations on either side of the boundaries can be made explicit. Appropriate design of the built environment and the nature of the situations themselves can promote or inhibit interaction. For example, interaction was encouraged when the boundary between a learning space and the street was open and learning activities were visible (see Table 14e and 14g).
Table 14: Evidence of Responsible Design, Processes and Contexts

<table>
<thead>
<tr>
<th>University of South Australia, Adelaide, and environs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Professional Outcomes</strong></td>
</tr>
<tr>
<td>(a) active elements—photovoltaic energy generation solar hot water systems</td>
</tr>
<tr>
<td>(b) passive elements - sun shading, orientation, operable windows</td>
</tr>
<tr>
<td>Jacaranda Court, Mawson Lakes Sustainable Development, Adelaide</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) DESIS Lab</td>
</tr>
<tr>
<td>(d) Design + Construct</td>
</tr>
<tr>
<td>(e) matchstudio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(f) Barbara Hanrahan Building</td>
</tr>
<tr>
<td>passive elements, north façade</td>
</tr>
<tr>
<td>(g) Kaurna Building</td>
</tr>
<tr>
<td>boundaries to studio space</td>
</tr>
<tr>
<td>(h) Kaurna Building</td>
</tr>
<tr>
<td>active elements, chilled beams</td>
</tr>
</tbody>
</table>

Source: photographs a, b, f-h: author’s own (2012); photographs c-e: (University of South Australia 2014a, b, c).
D.2.2 Contexts: Natural—Connecting with Natural Environments

Moderated natural environments serve to replace natural environments that have been removed from urban areas. These moderated environments provide an opportunity for individuals to engage with natural elements (e.g., plants, trees and water bodies). Such environments can be adjusted to suit the needs of the user in terms of its placement, design and amenity. At the Te Aro campus in Wellington (see Table 15a), the landscaped area immediately in front of the building was often used as a social place where people gathered or played sport. This area was part of the entrance to the faculty building. The public exhibition faced this area and the full height glazing allowed individuals to engage passively with moderated natural environments.

Unmoderated natural environments (i.e., conserved naturally occurring and native environments) can be difficult to retain in the urban built context. The topography of Wellingtons enabled access to unmoderated natural environments such as the Lambton Harbour and Mount Victoria (one of the mountains that surround the city; see Table 15b). These environments were well used for sport and recreation. The signage in key areas (e.g., the summit of Mount Victoria) suggested that these environments had educational benefit also. These environments were within walking distance of the city, free to access and were regularly used for a range of activities. From the documentation created, it was evident that these environments were highly valued by local communities and interaction with the natural context was not uncommon.

Passive strategies have become a key part of the climate-responsible design of First Light Studio (see Table 15c), the architectural practice formed by the students who led the Firstlight Project. Material selection and passive design strategies (i.e., shading, orientation and ventilation) were evident in their projects. These strategies demonstrate their understanding of climate and the priority placed on the natural environment when making design decisions. First Light Studio has developed an architectural language that reflects their approach and attitudes towards the environment that, while not unique, is distinctive (see Table 15d and 15e). Materials that are natural and responded to the New Zealand climate are visible in many of their projects. Their architectural language includes skillion or near-flat roofs, verandas, recesses for sun shading and optimised glazing. Where possible, natural unmoderated environments are retained. This architectural language can be observed elsewhere in New Zealand, and has become a language common to climate-responsible design.
### Table 15: Evidence of Natural Context and Demonstration of Connections

<table>
<thead>
<tr>
<th>University of Victoria, Wellington, New Zealand and environs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Informal Learning Environments</strong></td>
</tr>
<tr>
<td><img src="image1" alt="Te Aro Campus, Vivian St, Wellington" /></td>
</tr>
<tr>
<td><strong>Everyday Natural Environments</strong></td>
</tr>
<tr>
<td><img src="image2" alt="Lambton Harbour (left) and Mt Victoria (centre and right), Wellington" /></td>
</tr>
<tr>
<td><strong>Design Response to Natural Environments</strong></td>
</tr>
<tr>
<td><img src="image3" alt="The Meridian First Light House" /></td>
</tr>
<tr>
<td><img src="image4" alt="The Frontier Lodge" /></td>
</tr>
<tr>
<td><img src="image5" alt="The Wairarapa ‘Haybarn’" /></td>
</tr>
</tbody>
</table>

Source: photographs a-b: author’s own (2012), photographs c-e: (First Light Studio n.d.-a, b, c).
D.2.3 Contexts: Social—Supporting Interaction

When like-minded people come together for a common cause or reason, social groups are established. Students and staff in the Rural Studio program chose to participate in this program and as such, share a similar social responsibility. Within the formal learning activities, the high levels of engagement observed in individuals correlated with the value students placed on the skills and knowledge learned, and their motivation to succeed in their studies. The Rural Studio projects typically required a range of abilities and skills beyond the purely academic. Introductory activities encouraged students to determine their own preferences and level of abilities (see Table 16d). During this activity, students formed new relationships and gained new understanding about themselves and others. This understanding formed the foundation of the social groups that emerged during the learning experience.

Gathering places provided opportunities for students, staff and the broader community to come together for certain events or a common purpose. When provided outside formal activities, events at Rural Studio (e.g., weekly ultimate frisbee games and communal lunches [see Table 16e and 16 h]), encouraged people to interact, regardless of their role they held in the program. These events took place in the spaces that were designed and built by Rural Studio to encourage such social gatherings (e.g., the Lions Park sports ground). Formal learning spaces (e.g., the third-year studio [see Table 16b]) were used as gathering spaces outside formal teaching time (see Table 16f). There was a high level of student ownership of these spaces. Students were free to use the space and were responsible for its condition. Social interaction is more passive when a participant can observe without participating. The porous boundaries of the built context at Rural Studio supported passive engagement (e.g., the view out of the studio window to the adjacent playground [see Table 16g]).

Individuals learn together when learning outcomes are shared, work is reviewed peer-to-peer and curriculum is integrated. The fifth-year thesis projects were completed in small groups. Students collaborated throughout the learning process, as they explored structures, resolved design issues and constructed the final project (see Table 16a). Third-year students started the Rural Studio program with group activities, in which students documented, recorded and shared insights and ideas. The knowledge developed by students for use on their individual projects was collated for future students’ reference. The regular display of progress work in the studios encouraged students to critique each other. For both third-year and fifth-year cohorts, expert advice was provided by visiting experts. Full-time staff actively participated in these activities as learners (see Table 16c) to strengthen their knowledge across the curriculum.
Table 16: Evidence of Different Forms of Social Interaction

<table>
<thead>
<tr>
<th>Rural Studio, Auburn University, Newbern, Alabama</th>
</tr>
</thead>
</table>

### Formal Learning

- (a) Fifth-year thesis workshops
- (b) Third-year studio

### Informal Learning

- (c) Fifth-year—thesis projects progress
- (d) Third-year ‘yard work’

### Social Activities

- (e) Weekly community lunch
- (f) Lecture room
- (g) Fifth-year studio
- (h) Ultimate frisbee at Lions Park

Source: photographs: author’s own (2012).
D.2.4 Context: Educational—Visible Learning

Learning-by-doing supports visible learning in several ways. For example, making models of design (see Table 17a) simulated real-world conditions which made the impact of decisions visible to the designer and demonstrated the need for specific communication skills and abilities. Alternatively, full-scale construction (see Table 17d) validated the design process and the decisions made by students. Additionally, it made students’ errors evident for the purpose of critical reflection. This construction required collaboration skills and high levels of technical skill and understanding. At VUW, collaboration across a class or cohort, and high levels of coordination were required to curate, construct and exhibit project work (see Table 17g). Without these skills exhibiting project work would have been a challenging part of the learning processes.

Learning experiences can differ in regard to how the learning occurs, who participates and where it takes place. At University of South Australia, individual tuition (see Table 17b) was a deliberate, formal learning activity that allowed close interaction and focused communication between staff and students. While the learning can be highly visible to those involved, it is not easily shared. The informal learning observed at Rural Studio (see Table 17e) occurred when participants worked in shared learning spaces with high levels of ownership and access. Participants shared insights or difficulties with each other, prompting collaboration. When unplanned and unprepared, these experiences could test the success of the communication and language used. At VUW, learning was tacit when individual tuition took place within a group (see Table 17h). The issues discussed and suggestions made to one student were used by another, when applicable. This prompted critical thinking, as the same solution was applied to different scenarios.

Being-in-place supports the development of an individual’s knowledge of their known world and the known world of others. However, this knowledge can also be gained through sharing and simulating experiences. At VUW, experiences were shared through visual displays (see Table 17c and 17i) and panels of text. These displays shared experiences passively, described the situation, and explained the insights and knowledge gained. Understanding of past events can be gained through firsthand experience of relevant environments, prompting the transfer of knowledge from the known-of world to the known worlds (see Table 17f). Visual information, supplemented by personal narratives (see Table 17i), enabled experiences to be shared through conversations and personal interactions. This sharing of experiences increased individuals’ motivation to gain first-hand experience and seek ways of transferring the knowledge of the known-of world to the known world.
Table 17: Evidence of Visible Learning in Different Ways

<table>
<thead>
<tr>
<th>Learning By Doing</th>
<th>Learning Experiences</th>
<th>Being In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of South Australia</td>
<td>Rural Studio, Auburn University</td>
<td>Victoria University of Wellington</td>
</tr>
<tr>
<td>(a) model making</td>
<td>(d) construction</td>
<td>(g) exhibition curation</td>
</tr>
<tr>
<td>(b) formal - individual tuition</td>
<td>(e) informal - small group</td>
<td>(h) tacit—shared learning</td>
</tr>
<tr>
<td>(c) displaying other’s known-world</td>
<td>(f) expanding the known-world</td>
<td>(i) sharing experiences with others</td>
</tr>
</tbody>
</table>

Source: photographs: author’s own (2012).
**D.2.5 People—Scale of Social Groups**

The effect of the scale of the social group on transformative learning is related to individuals’ skills and abilities (e.g., inter-personal skills, emotional literacy, and communication skills). The social group is affected by types of learning activities and affects whether participating in these activities is a transformative experience.

In the case studies, it was observed that learning individually (see Table 18b) or in pairs (see Table 18a), provided a more intimate experience, in which reflection and sharing experience encouraged the critical thinking that prompts transformation. The insights students made focused on defined issues; assumptions were more readily challenged and alternative points of view were offered (see Table 18c) when the relationships in the small groups were positive. When an individual is intrinsically motivated and has high levels of self-reflection, challenging assumptions and critical thinking can be done alone when learning is supported by small, private spaces.

The diversity of experiences and backgrounds prompted discussion (see Table 18d), and the sharing of ideas (see Table 18e) and points of view (see Table 18f) when individuals came together in medium-sized groups. Differences in opinion, ideas and solutions challenged existing positions and values, which prompted change. The likelihood of change depends on the communication skills of those involved and the nature of the space provided. Exchange of opinions and ideas are more likely when there is a common language or understanding, it is possible to display work and the learning progress and outcomes are shared.

When consistent information is provided to large groups, like-mindedness and a sense of community is promoted and fostered through common understanding. This common understanding relies on communication that is engaging and meaningful. When examples from real-world experiences (see Table 18h) were provided, the transfer of knowledge from the known-of world to the known world was supported. Opportunities for smaller discussions or moments of reflection within the large group (see Table 18g) supported the consolidation of change. When the multiple communities of an individual were recognised (see Table 18i) and the differences of these communities were made explicit, insights as to how and why these differences arose were prompted.

The role of those involved affected the level of engagement and opportunity for transformation. The modes of teaching practice (i.e., whether the learning was focused on the teacher, the student or change) limited or enhanced these opportunities for transformation. This is discussed further in Section D.2.8., D.2.9.Interaction—*Learning Experiences*, and D.2.10.
Table 18: Evidence of the Different Scales of Social or Learning Groups

<table>
<thead>
<tr>
<th>Rural Studio, Auburn University</th>
<th>Victoria University of Wellington</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small</strong></td>
<td></td>
</tr>
<tr>
<td>(a) Out the front of red barn studio</td>
<td>(b) study carrels in studio</td>
</tr>
<tr>
<td>‘...on a day to day basis we plan and run the studio, design studio and I co-teach ... we also coordinate the site work anywhere from organising materials to organising people to figuring out what’s the next steps to helping.’</td>
<td></td>
</tr>
<tr>
<td>(c) Academic B, Rural Studio</td>
<td></td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td></td>
</tr>
<tr>
<td>(d) thesis project planning</td>
<td>(e) design studio</td>
</tr>
<tr>
<td>‘...community here seems like a network of people that are actually somewhat connected and know each other and they might have different opinions but there’s kind of a collective thought about the place in which they live ... somewhat loose agreement about the environment in which you live or the space in which you inhabit.’</td>
<td></td>
</tr>
<tr>
<td>(f) Academic E, Rural Studio</td>
<td></td>
</tr>
<tr>
<td><strong>Large</strong></td>
<td></td>
</tr>
<tr>
<td>(g) guest workshop</td>
<td>(h) professional practice lecture</td>
</tr>
<tr>
<td>‘I have one community is my family. Another community is myself and Academic B and the students. Another community is just you know the university as a whole. And then I have kind of, I feel I have a community in Newburn but it’s actually three communities in one because they’re the white people, the [inaudible] and us.’</td>
<td></td>
</tr>
<tr>
<td>(i) Academic C, Rural Studio</td>
<td></td>
</tr>
</tbody>
</table>

Source: photographs: author’s own (2012).
D.2.6 People—Complexity of Social Groups

The complexity of the social groups, the relationships of the individuals within the groups, and the interaction between the groups can affect transformation. Social groups provide a supportive social context for learning and change is likely when standard practice and social norms are challenged. When groups comprising diverse experience, background, language and ability inter-connect, interaction can prompt exploration and acceptance of differences. The connections between groups can motivate individuals in other groups to shift their viewpoint, expanding individuals’ sense of community. Interviews with staff at VUW demonstrated that the common language required to facilitate is not necessarily spoken or written, but could be perceived in behaviour that is passionate or enthusiastic (see Table 19). For Academic F, the connections between the different groups (e.g., architects, contractors, consultants) were more easily made when the scale of each community was small and the interaction more personal.

Individuals within intra-connected social groups have a strong connection to each other. This connection fosters, and is strengthened by, like-mindedness and a similarity in world view. Researchers, such as Academic A, were brought together with like-minded colleagues; the connection between individuals was strengthened by a common language, similar relationships and familiar actions.

The level of inter-connectedness between groups and intra-connectedness within groups and individuals is affected when groups are isolated or discrete, or when there are isolated individuals within a social group. Connection between isolated groups and individuals can make the sharing of experiences and exposure to other viewpoints difficult to achieve. Such limited connections can affect the potential for transformative learning. As Academic B explained, when individuals are isolated there is minimal opportunity for connection. This situation resulted in limited or no interaction between individuals or groups, limiting opportunities for change. Additionally, while the outcome of isolated learning (e.g., an individuals’ research thesis or dissertation) can provide targeted critical thinking and precise communication, collaboration can be limited. However, the situation described by Academic B, in which minimal connection occurred, prompted reflection and introspection, supporting targeted and focused learning.
Table 19: Evidence of the Different Types of Complex Social Groups

Excerpts from Transcribed Interview of Staff Members at Victoria University of Wellington.

Inter-connected

‘...I seem to be reasonably well known... It could be that I’m passionate but yes I know most of the architects in Wellington which I quite like. When I was in London you’re very much a tiny, tiny spec in the pond whereas over here you get to know really everybody and what they’re doing, things like that. And so having worked here for ten years I also know quite a few of the contractors and a lot of the consultants so I’m really well placed in terms of being able to link into different things.’
Academic F

Intra-connected

‘...the network is two or three places probably really important to me. One that is like essential is with a chap...we’ve built up a collaboration over the years...we’ve kept up a good relationship over the years so he’s a really, he’s a linchpin of what I’m doing but he also has a network of people like me and other research students...So I also have that network of other people who used it and I’ve used them in, last week I did, I find myself in contact with some of these people...so we shared the chapter kind of thing. And that’s been a great network.’
Academic A

Isolated

‘I think to me community...it’s a kind of amorphous you know, it’s difficult to define and it’s probably more real when it’s not defined, like you know you can have a community of researchers which is these ten people but I think when I talk about community especially when I’m teaching I’m really talking about the greater conglomeration of humanity so whether that’s in a community, an urban environment or a community of like-minded people or whatever which is kind of a [inaudible] relationships and personal context rather than something which is not as real. You mean you can have [inaudible] and typically be in the same community as them but not really have anything to do with them. So I guess to me the key thing about community is relationships’

‘- I did have some research contacts with people in other parts of the world a bit earlier on but for the last sort of two years or so I’ve been trying to get my own Ph.D finished and of course you have to be careful about how collaborate with people so I’ve just finished that and now, probably in the future I would have more collaborations...’

Academic B

Source: author’s own (2012).
**D.2.7 People—Benefit to Self and Others**

Merriam Webster Dictionary (2016) defines learning as, ‘the acquisition of knowledge and/or skills through experience, study or by being taught’. Typically, an individual seeks to gain or benefit directly from their learning. Opportunities to share this individual benefit with others (e.g., within their social groups or further afield) can support individuals’ transformation and prompt transformation in others. This benefit can motivate others to transform as individuals’ experiences and improvements can prompt others to participate in the activity and undergo similar transformation.

The first design-build projects completed by students when the Rural Studio program commenced 20 years ago was the students accommodation (see Table 20a), which were still in use as accommodation for third-year students during the researcher’s case study visit. These cabins, and other design-build projects completed by students at the Rural Studio Farm, were also learning resources for current students. Additionally, Rural Studio projects have provided much needed public amenity (see Table 20b) and housing (see Table 20c) for the local community. The benefits for the staff teaching in the program, while less visible, were also meaningful. The teaching experience at Rural Studio supported the development of strong and profound relationships with individuals and community (see Table 20e). Many of the staff at Rural Studio were graduates of the program and delayed progress in their architectural career to teach.

Reciprocated benefit (i.e., when everyone involved in the learning experiences benefits, formally or informally) was clearly visible at Rural Studio. Community members from a range of social groups within and external to Rural Studio participated in regular sporting events (e.g., ultimate frisbee [see Table 20b]). The relationships between the players were strengthened as the names of each player were known; the teams adjusted as new people arrived and other teammates left. These events were held at Lions Park where design-build projects (see Table 20j) provided benefit for the Rural Studio community and the public. Benefit was reciprocated among staff when workshops conducted by invited guests (see Table 20f) provided an opportunity to reflect on current practices. Assumptions were challenged and knowledge gaps were identified as these guests responded to the needs of the students and the projects.

The shared or mutual benefit of the student work were longer lasting when the beneficiaries of the project were clearly defined (see Table 20i). However, when the benefit was less directly felt (e.g., when the owner of the building did not use or occupy the project), the benefit was short-lived (see Table 20k).
### Table 20: Evidence of Benefit to Self and Others at Rural Studio

<table>
<thead>
<tr>
<th>Direct</th>
<th>Reciprocated</th>
<th>Shared</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Student" /> (a) Student cabin, Rural Studio</td>
<td><img src="image2" alt="Student" /> (b) Ultimate Frisbee, Lions Park</td>
<td><img src="image3" alt="Student" /> (c) Music Man House, Perry County</td>
</tr>
<tr>
<td><img src="image4" alt="Staff" /> (e) Lunch, Rural Studio Farm</td>
<td><img src="image5" alt="Staff" /> (f) Guest workshop</td>
<td><img src="image6" alt="Staff" /> (g) Work at 20K house, Faunsdale</td>
</tr>
<tr>
<td><img src="image7" alt="Community" /> (i) Butterfly House, Masons Bend</td>
<td><img src="image8" alt="Community" /> (j) Lions Park, Greensborough</td>
<td><img src="image9" alt="Community" /> (k) Boys and Girls Club 1, Akron</td>
</tr>
</tbody>
</table>

'...you learn a lot about yourself and what you're good at, what you're not good at and you learn how to work with others ... working in groups it balances people out ... And finding that balance like that takes time but during that process you learn a lot about yourself and who you are.'

(h) Academic B, Rural Studio (describing the reciprocated benefit for staff)

'...trying to sensitively integrate in with the ideals of the community ... so then we can also in some respects provoke the community ... to ask questions like what in the world are you doing and then we can explain to them our take on what we're doing and then they can give us feedback and try to create a dialogue ...'

(l) Academic B, Rural Studio (describing the shared benefits for the community)

Source: photographs: author’s own (2012).
**D.2.8 Interaction—Teaching Practice**

Different teaching practices can place different roles (i.e., expert or novice) at the centre of the learning experience. A sense of ownership and the nature of the learning contexts can shift power from teacher to student. Alternatively, when this position of power is challenged by all participants, all participants can become novices and learn together.

Pedagogy (i.e., teacher-focused practice) can be implemented to different extents. A common mode of practice is when one person, usually the teacher as expert, imparts information or explains a skill to others. This was typically observed in formal lectures at VUW (see Table 21b), when consistent information was delivered to a group of students and the learning space (e.g., the lecture theatre) was controlled by the teacher. In pedagogical practice, it can be difficult to challenge this control. Often, students have little agency in this type of learning experience. However, a different type of pedagogical practice was observed at Rural Studio, wherein students adopted the role of expert in an informal peer review (see Table 21a). Students were encouraged to explore a specific topic and share their expert knowledge with their peers.

In andragogical practice (i.e., learner-focused practice) the teacher facilitates and guides the student as they direct their own learning. This was most commonly observed in the case studies when discussions took place in small groups around a collection of work, and both staff and student contributed. In this situation, all participants had a high sense of agency and the roles of expert and novice were less clearly defined. This mode of practice was observed in spaces at VUW when an individual’s learning was visible to the group (see Table 21d) and at Rural Studio when students took responsibility for their learning spaces (see Table 21c).

Critical pedagogy (i.e., change-focused practice) is supported when control of the learning and the contexts is shared. This mode of practice is more easily accommodated when the students set their own problem and establish the direction of their projects. At VUW, unstructured, or loosely controlled learning spaces, allowed students to adapt their environments to suit their needs (see Table 21f). When a group of students work together on a problem, share ideas, and critique each other easily, responsibility is shared. This was observed at Rural Studio when a group of four students created a collective drawing, concurrently drawing and diagramming their ideas and thoughts on the same piece of paper (see Table 21e). This practice worked well when there was the time to allow this collective drawing to occur naturally. The students collaborated openly and respectfully and communicated effectively using visual, written and spoken skills.
Table 21: Evidence of Relevancy of Content to Immediate Task

<table>
<thead>
<tr>
<th>Pedagogy</th>
<th>Victoria University of Wellington</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Student peer-review</td>
<td>(b) Technology lecture</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Andragogy</th>
<th>Victoria University of Wellington</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) Informal design discussion</td>
<td>(d) Design studio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Pedagogy</th>
<th>Victoria University of Wellington</th>
</tr>
</thead>
<tbody>
<tr>
<td>(e) Third-year collective drawing</td>
<td>(f) Final-year studio</td>
</tr>
</tbody>
</table>

Source: photographs: author’s own (2012).
Interaction—Learning Experiences

Within a learning experience, students can shift from novice to expert when they teach their peers a skill they have recently mastered. At Rural Studio, this was observed during the yard work exercise when one student was asked by his peers to demonstrate what he had been learning about welding (see Table 22a). New skills and knowledge were consolidated when he instructed others because teaching others required the individual to reflect and think critically about their own learning. Interaction with peers can create new meanings and challenges individuals’ existing world views. At VUW, students were required to review and critique their peers’ work as part of their learning process (see Table 22b). The likelihood of a disturbing dilemma occurring was increased in this new role as an expert because individuals saw their own errors in the work of their peers and thus, had their point of view challenged.

As mastery of specific skills deepens knowledge through critical thinking, the cognitive processes (i.e., levels of thinking) become more challenging. However, if the challenge is too great, and individuals do not have the skills or abilities to overcome this challenge, motivation is lost, and individuals are likely to give up. At Rural Studio students were required to document each step of a particular task, prior to carrying it out (see Table 22c). In doing so, students demonstrated their skills, and anticipated and discussed problems, through shared methods of communication (e.g., visual, written and spoken languages). At VUW, exhibition installation (see Table 22d) became an iterative design process as the work to be exhibited was designed to different parameters. The in situ construction challenged students’ prior decisions, prompting change. This contrasted to the architectural education programs in which the documentation indicated that the learning experiences strengthened and deepened existing skills and knowledge. As such, current values and positions were confirmed, but not challenged.

Transmissive learning (i.e., the transmission of knowledge from one person to others) is necessary in architectural learning. An individual’s understanding that is gained in this way increases their awareness of differences in experience and meaning as they navigate and respond to the challenges of a transformative experience. At Rural Studio, visiting experts explained the science of architectural technology (i.e., the rules of structural performance) before students tested their structural design (see Table 22e). At VUW staff shared personal experiences of a project in a technology lecture before guiding discussions with students as they resolved similar problems in the design studio (see Table 22f).
Table 22: Evidence of Learning Individually and with Peers

<table>
<thead>
<tr>
<th>Multiple Roles of People</th>
<th>Rural Studio</th>
<th>Victoria University of Wellington</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Third-year yard work</td>
<td></td>
<td>(b) Second-year technology class</td>
</tr>
<tr>
<td>(c) Third-year furniture workshop</td>
<td></td>
<td>(d) Exhibition installation</td>
</tr>
<tr>
<td>(e) Fifth-year technology class</td>
<td></td>
<td>(f) Third-year technology classes</td>
</tr>
</tbody>
</table>

Source: photographs: author’s own (2012).
D.2.10 Interaction—Modes of Learning

Active learning (i.e., doing) is transformative although it can be difficult and challenging. For some individuals, this challenge may inhibit—rather than prompt—learning. For some individuals, passive learning (i.e., watching) may be preferred. During the yard work activity at Rural Studio, students were encouraged to determine their preferred mode of learning. One student chose to learn a new skill through direct experience (see Table 23a, left and centre), while others watched and learned through observation (see Table 23a, right). Similarly, during a workshop focused on building codes, students passively learned to apply building codes to design (see Table 23b, left and centre) while actively experiencing the implications of impaired mobility as they used a wheelchair (see Table 23, right).

Understanding situations via real or virtual experiences can prompt change, as students explore issues through simulation. This was observed at Rural Studio when students documented the steps required to make a chair, before participating in the real experience of making the chair (see Table 23c). This experience increased students’ awareness of learning, as mistakes were made in the simulation with minimal consequences. Alternatively, students’ understanding of other world views was increased when real-life experiences (e.g., food consumption) were documented and shared (see Table 23d). This reflective process challenged individuals’ positions and assumptions, as recording and documenting experiences prompted critical thinking.

Interaction between social groups supports the sharing of diverse experiences and increases exposure to different modes of communicating, understanding and knowing. Learning within a group of like-minded people reinforces existing understanding through common language and shared goals. This was observed at Rural Studio when universal rules of structures were applied to individual designs and tested (see Table 23e). The theoretical concepts were explained using subject-specific language, experienced collectively, and misinterpretations or misunderstandings were discussed and resolved. Similarly, shared language and understanding supports learning between groups. However, when these groups are not like-minded, assumptions and existing knowledge are challenged and change is prompted. The third-year students at Rural Studio relied on the work of previous students’ progress to advance to the next stage of a longitudinal project (see Table 23f). When the documented information differed from the current students’ understanding, the reason for this difference was investigated, and their understandings were challenged.
Table 23: Evidence of Different Modes of Learning

<table>
<thead>
<tr>
<th>Rural Studio, Auburn University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive and Active</td>
</tr>
<tr>
<td>(a) Third-year yard work</td>
</tr>
<tr>
<td>(b) Guest workshop for thesis</td>
</tr>
<tr>
<td>Simulated Experiences</td>
</tr>
<tr>
<td>(c) Third-year workshop</td>
</tr>
<tr>
<td>Real Experiences</td>
</tr>
<tr>
<td>(d) Third-year presentations</td>
</tr>
<tr>
<td>Within Groups</td>
</tr>
<tr>
<td>(e) Thesis technology class</td>
</tr>
<tr>
<td>Between Groups</td>
</tr>
<tr>
<td>(f) previous Third-year work</td>
</tr>
</tbody>
</table>

Source: photographs: author’s own (2012).
D.3 Defining Types of Transformative Experiences

The methods discussed in Appendix B have been applied to the selected architectural education programs and the case studies of architectural learning. The analysis of this documentation has made explicit the types of the experiences (i.e., the events, situations and activities) that contribute to transformative learning and prompt a shift in world view.

Further analysis of the documentation has informed the refining of the coding framework discussed in Section D.2 (see Table 13) and led to the identification of types of learning experiences—the events, situations and activities—that are most likely to prompt, support and sustain transformation (see Table 24). Catalyst events that are uncommon, unusual or uncomfortable can challenge individuals’ assumptions and beliefs. Some catalyst events evolve into situations in which a new or different world view can develop, as culminating experiences confirm the shift in values. Activities within these learning experiences sustain transformation, as the skills and knowledge developed by and within the new world view strengthen the shift in position. The types of the experiences that contribute to transformation and a shift in world view, are evident in both architectural education programs and case studies learning experiences. The descriptions in this appendix have informed the definitions of the nature of transformative experiences discussed in Chapter 6 of the thesis.

In Table 24, the relevant elements and their associated characteristics are listed for each of the experiences, building upon the elements and characteristics from the original coding framework (see Table 13). The dimensions of the learning experience (i.e., time and scale, intensity and agency) discussed in Chapter 6 of the thesis were identified in the documentation created. Each type of experience provides different opportunities for those involved to shift their epistemological position and the ability to change is learned is also evident. The skills required for meaningful learning—the ability to make decisions and engage with new and familiar situations, individually and with others—are identified in the learning activities observed.
### Table 24: The Refined Coding Framework of Transformative Experiences

<table>
<thead>
<tr>
<th>Experience</th>
<th>Element</th>
<th>Characteristic</th>
</tr>
</thead>
</table>
| **Intense contexts** | Context | Boundaries—promoting interaction  
| | | Gathering spaces—places to come together  
| | People | Scale of social groups  
| | | Intra-connected (likeminded)  
| | Interaction | Between or within social groups  
| **New and familiar contexts** | Context | Passive operable—encouraging interaction  
| | | Moderated—replacing lost environments  
| | | Being in place—knowing the world  
| | People | Interconnected and intra connected  
| | Interaction | Understanding via real or virtual experiences  
| **New and familiar experiences** | Context | Being in place—knowing the world  
| | People | Intra-connected (likeminded)  
| | Interaction | Understanding via real or virtual experiences  
| **Integrating curriculum** | Context | Learning by doing—experiential learning  
| | People | Interconnected  
| | Interaction | Understanding via real or virtual experiences  
| **Awareness of group and self-development** | Context | Passive operable—encouraging interaction  
| | | Prompting people to come together  
| | People | Scale of social groups  
| | Interaction | Between or within social groups  
| **Learning individually and with peers** | Context | Gathering spaces—places to come together  
| | People | Scale of social groups—small  
| | | Intra-connected (likeminded)  
| | | Shared benefit  
| | Interaction | Passive vs active—watching and doing  
| **Collective decision-making** | Context | Learning by doing—experiential learning  
| | People | Reciprocated benefit  
| | Interaction | Passive vs active—watching and doing  
| | | Understanding via real or virtual experiences  
| **Developing sense of self/others** | Context | Gathering spaces—places to come together  
| | People | Scale of social groups  
| | | Shared benefit  
| | Interaction | Understanding via real or virtual experiences  
| **Experience—shared/personal; real/simulated** | Context | Boundaries—promoting interaction  
| | | Gathering spaces—places to come together  
| | People | Scale of social groups  
| | Interaction | Understanding via real or virtual experiences  
| **Relevancy of content to immediate task** | Context | Learning experiences—how, who and where  
| | | Being in place—knowing the world  
| | People | Scale of social groups  
| | Interaction | Role of individuals—novice/expert  
| | | Cognitive process - levels of thinking  


In this section, the transformative experiences observed and documented are described. However, describing all the examples from the documentation is beyond the scope of this thesis and therefore, selective examples of current practice and case studies are provided. When particular experiences were provided in more than one program, those
events, situations and activities that most aptly illustrate the characteristics of that experience have been described in-depth. The documentation created when visiting the case studies of architectural learning has led to the more detailed discussion of the events, situations and activities found in Chapter 6 of the accompanying thesis.

**D.3.1 Events that Prompt Change**

Events that prompt transformation—those that challenge individuals’ assumptions and world view—are typically intense and contain both newness and familiarity. That is, intense interactions occur within new and familiar contexts. These interactions can engender the discomfort that increases awareness of change. The experiences that occur because of change can be unexpected. Unusual occurrences can make change more noticeable and apparent. Such events prompt the critical reflection that leads to a shift in world view. However, for those involved to be able to respond to this change, the change must be apparent to the individuals themselves. In some experiences, the contexts are intense by nature of the density of the built context, the diversity of the social groups, or the focus of the educational context (see Table 25).

**Table 25: Characteristics of Events that Prompt Change**

<table>
<thead>
<tr>
<th>Experience</th>
<th>Opportunity</th>
<th>Element</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intense Contexts</td>
<td>Events that prompt</td>
<td>Context</td>
<td>Boundaries—Promoting Interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gathering spaces—places to come together</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant</td>
<td>Scale of social groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Intra-connected (likeminded)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td>Between or within social groups</td>
</tr>
<tr>
<td>New and familiar contexts</td>
<td>Events that prompt</td>
<td>Context</td>
<td>Passive operable—encouraging interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Moderated—replacing lost environments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Being in place—knowing the world</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant</td>
<td>Inter + intra connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
</tr>
<tr>
<td>New and familiar interactions</td>
<td>Events that prompt</td>
<td>Context</td>
<td>Being in place—knowing the world</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant</td>
<td>Intra-connected (likeminded)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td>Role of participants—novice / expert</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Understanding via real or virtual experiences between or within social groups</td>
</tr>
</tbody>
</table>


A change in the system can be identified by the introduction of new characteristics of the elements (i.e., context, people and interactions) within the system, which differ from existing more familiar characteristics. Newness in context or experience, when balanced by elements of familiarity, can result in a shift in world view, as the newness can prompt
individuals to question the familiar. Change in the system is evident when the elements of the system change (e.g., new contexts emerge, additional people are integrated, or different interactions occur).

Campus-based architectural education programs are more likely to provide similar experiences in the social, built and educational contexts. Groups of likeminded individuals share a common purpose, come from similar backgrounds and contribute to an intense social context. An urban environment provides an intense built context due to the density of the urban fabric. For those involved in architectural education programs, the educational context extends beyond the classrooms and formal learning experiences into the urban environment. An urban environment provides an intense social context. This is because social interactions are more diverse and increase in frequency. However, urban environments limit exposure to the natural context.

Clearly expressed boundaries promote close interaction between individuals across contexts, which intensify the experience. The urban campus of the University of South Australia has the greatest proportion of built and natural contexts of the programs documented, although the natural context is highly moderated. Proximity, ease of access and visibility of this natural context promotes interaction of individuals in this context and their connections with the built context. The clear delineation between the built and natural context amplifies their differences. As such, similar events held in these contrasting contexts will be experienced differently.

The size, nature, location and type of gathering spaces and places to come together condenses or disperses social groups. The community on the VUW campus remains tight-knit, despite the size of the cohorts in the architectural education program. This closeness was supported by the built context, as most people lived, played and worked within walking distance of the campus. The reduced size of the built context increased the density of the social context, resulting in formal learning events or informal social events in which individuals who would not usually come together had the opportunity to interact.

The scale of social groups within formal learning experiences and informal everyday events intensifies a learning experience. When the groups are small, the context is focussed and events are isolated from surrounding contexts. This scenario was observed at Rural Studio, where the small learning community operates within a town of approximately 200 people. Social connections were reinforced in these smaller social groups as students, staff and members of the community were likely to be involved in multiple events.

Intra-connected (i.e., like-minded) social groups are strengthened when individuals have chosen to be a part of the program or learning activity. Rural Studio is offered as an
elective to architecture students at Auburn University. The individuals who chose to participate (i.e., staff and students) share common values and academic and professional aspirations. This like-mindedness is strengthened as relationships established in the third-year activities influence the likelihood of participants electing to return in their fifth year. This intra-connection was evident in interviews with staff, as individuals spoke about the friendships and meanings made by Rural Studio students. These meaningful connections shaped their decision to continue at Rural Studio as staff.

The small scale of the social groups and the isolated nature of the built and natural contexts encouraged interaction between social groups. Social gatherings outside formal learning activities were scheduled into the Rural Studio experience and included other social groups from outside the architecture program. Community dinners, regular sporting activities (e.g., ultimate Frisbee) and employment provided opportunities for the different social groups within the broader Rural Studio communities to come together. The small scale of these communities increased the likelihood of such events occurring. Interaction was more likely when these informal events were repeated and the social groups were diverse.

While all programs examined in this study conducted activities that involved learning-in-place, the amount of time spent in place varied. The events within the selected architectural education programs were often focused on a single unit or subject area (e.g., design or cultural studies). As such, the opportunity to apply knowledge or skills learned to other subject areas was limited. Less time spent in place could affect the depth of individuals’ understanding of the contexts and how these contexts can change (e.g., demographic shifts; transient populations, such as tourists; seasonal weather; and aging). The architectural education programs documented typically had dedicated buildings and teaching spaces. These spaces become familiar learning spaces for students and staff over time. Most of these programs had a high proportion of part-time staff and visiting experts (i.e., academics and practitioners), increasing the diversity and newness within the learning experience. At campus-based programs these familiar environments were where staff and students also lived. In two of the three case studies of architectural learning (i.e., University of South Australia and VUW), many of those involved in the program lived in the city close to campus where there were less educational buildings. As such, places used for socialising, such as cafes and pubs, have become closely associated with certain activities may become new when used for learning activities.

Passive and operable elements within the built context encourage interaction that relies on familiarity with specific architectural language (e.g., louvered windows) and environmental conditions (e.g., seasonal cooling breezes). Moderated natural environments
support connections with the natural contexts. Familiar design language increases the likelihood of individuals spending time in these familiar contexts. However, interacting in and using such moderated environments can be challenging. These moderated environments provide a contrast to familiar contexts, making explicit any gaps in experience, prompting reflection and challenging assumptions. Spending time in place increases familiarity with a given situation and provides newness, as unexpected conditions and events occur that noticeably change the characteristics of the contexts. Inter-connectedness (i.e., interaction across social contexts) can make explicit like-mindedness and similar world views, increasing individuals’ familiarity. Characteristics of an experience can seem new when different viewpoints are shared through these connections across groups. Real and virtual experiences and the development of a common language lead to a common understanding when the contexts are familiar to all involved.

At the University of South Australia the diverse backgrounds of individuals was a new experience for students working together. The different cultural backgrounds and prior learning of students meant that their previous experiences of social, natural and built contexts were diverse. However, for those with an architectural background the learning experience was familiar in terms of the skills required and the focus on design.

At Rural Studio, the physical and natural contexts were new for many when they first entered the program, as students experienced the rural landscape and towns for the first time. The built and natural contexts were different from the Auburn University campus. The immediate social context was familiar for those students who had studied together for at least two years. Many elements of the educational context (i.e., the structure and the learning outcomes) were similar to the educational contexts experienced at the main university campus and the students were well-versed in the visual, spoken and written communication required.

At VUW, students learned an identifiable architectural language directly related to the materials, construction methods and thermal and structural performance. The immediate built and natural contexts were familiar to many of the students who lived close to the campus. This familiarity supported student engagement in the learning experiences, as the design projects resolved situations that were common occurrences (e.g., earthquakes). The social context was familiar as most students shared experiences by progressing through their studies together.

The analysis of the examples of the selected architectural programs indicated that specific events (e.g., study tours and field trips) in which students and staff travel to experience new contexts together prompted both new and familiar interactions. When an experience is new and challenging, individuals are more likely to reflect on past experiences,
discuss emerging issues and gain new understandings. However, this is only likely to occur if the immediate social context is familiar and comfortable.

At Rural Studio, being-in-place is critical to these challenging experiences, as an individual’s familiarity with new places develops over time. For the fifth-year students, many of the activities and experiences that were new in their third year became familiar by their fifth year. However, the expectations of staff and the community increased for the fifth-year student: a higher level of ability and critical thought was required. This element of the educational context was challenging as new skills and modes of interaction were required and the role of the student was both novice and expert. The interaction between the year groups at Rural Studio was strengthened by the fifth-year students’ familiarity with the third-year experience. At VUW, one staff member used familiar (i.e., local, high profile projects) to explain a new response to a familiar design problem. Another staff member used international examples, which students were less likely to have experienced, to demonstrate how a familiar design response emerged from a new or unfamiliar scenario.

When students share experiences, they develop a new like-mindedness. Together, students come to understand a familiar problem in new ways as they question each other and develop new understanding. In this way, the familiarity or newness of different contexts within learning experiences influence the potential of learning to prompt change.

**D.3.2 Situations that Support Change**

The dimensions of experience that are most relevant to situations that support transformation are those in which the people involved have high levels of agency. The capacity to change, developed by decision-making processes and the opportunity to learn individually and with peers consolidates and affirms new knowledge and strengthens new skills. Time and intensity also influence situations. The timing of learning experiences, the alignment of focus and the complexity of the social and educational context reinforce new insights and understandings. The extent to which the contexts are integrated within the learning experience supports the transfer of knowledge from one domain to another, as understanding gained in one area can be applied to another area, including new areas (see Table 26). Sharing learning outcomes makes the learning process visible to all, increases awareness of self-learning and promotes recognition of the progress made by the whole group. Existing skills and abilities, as well as the shared development of new ones, are accommodated by individual learning experiences, as well as learning with and from peers. Learning with others who are experiencing a similar shift in world view, or now hold the new world view, can assist
individuals to overcome the associated challenges. The capability to reflect critically together as part of the decision making process strengthens communication and collaboration skills.

Table 26: Characteristics of Situations that Support Change: Integrated Curriculum

<table>
<thead>
<tr>
<th>Experience</th>
<th>Opportunity</th>
<th>Element</th>
<th>Characteristic</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Situations that support</td>
<td>Context</td>
<td>Learning by doing—experiential learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant</td>
<td>Interconnected</td>
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<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Cognitive process - levels of thinking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mode of learning</td>
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<td></td>
<td></td>
<td>Awareness of group and self-development</td>
<td>Context</td>
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<td></td>
<td></td>
<td></td>
<td>Prompting people to come together</td>
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<td></td>
<td>Participant</td>
<td>Scale of social groups</td>
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<td></td>
<td>Interaction</td>
<td>Between or within social groups</td>
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<tr>
<td></td>
<td></td>
<td>Context</td>
<td>Gathering spaces—places to come together</td>
</tr>
<tr>
<td></td>
<td>Learning individually and with peers</td>
<td>Participant</td>
<td>Scale of social groups—small</td>
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<td></td>
<td>Intra-connected (likeminded)</td>
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<td></td>
<td></td>
<td></td>
<td>Shared benefit</td>
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<td></td>
<td></td>
<td>Interaction</td>
<td>Passive vs active—watching and doing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Context</td>
<td>Learning by doing—experiential learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participant</td>
<td>Reciprocated benefit</td>
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<tr>
<td></td>
<td></td>
<td>Interaction</td>
<td>Passive vs active—watching and doing</td>
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<tr>
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<td></td>
<td>Understanding via real or virtual experiences</td>
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</table>


The analysis of the documentation of the selected architectural education programs indicated that there were few opportunities for cross-curricular teaching. When cross-curricular teaching was practiced, it was typically across the culture and design subject areas. The different approaches to teaching and learning in the three case studies of architectural learning integrated curricula in ways that supported effective and engaging learning.

At VUW, an integrated curriculum was observed in their practice of learning-by-doing (i.e., experiential learning). Model making was used to test ideas and explain design concepts, situating design projects in real life scenarios. When practitioners are involved in the learning activity, the interconnectedness across academic and professional groups is strengthened through the sharing of experience regarding local projects. The virtual experience of the design project (e.g., the train station project for second-year students, and the mixed-use apartment project for fourth-year students) reflected real experiences, as both were located on easily accessible sites close to the campus. When students created their own projects based on real-life situations, the levels of thinking were high. Students reflected on their own experiences to inform their design.
The mode of learning can vary in an integrated curriculum. At VUW different pedagogical practices were observed in the formal lectures, wherein the delivery of information was transmissive. In a technology lecture, a subjective narrative style was used, in which personal experiences on local projects were related. In a design lecture, a more abstract narrative was used to present visual communication and presentation techniques. In the studio, andragogical practice was observed when studio staff discussed the project with students in groups. Students contributed to the development of their peers’ projects as well as their own. Students transferred their learning from their technology units to their designs and used the presentation of the design projects to illustrate the application of technological theory. The integrated curriculum was demonstrated by staff who teach across both subject areas, as they used the same learning space for the technology tutorials and design studios.

At Rural Studio, the observed integration of curriculum was vertical (i.e., shared through documentation and formal activities), rather than through exhibition and informal experiences. Information compiled by one group of third-year students as part of their assessment informed the work of the subsequent cohort the following year. Learning activities undertaken in students’ third year were repeated with the same visiting expert in students’ fifth year, in more detail to resolve more complex problems. As these learning activities took place in the studio, this was also considered an example of integration.

Within the documentation of selected architectural education programs there was evidence of many opportunities to exhibit learning outcomes and demonstrate development of skill and knowledge. Most programs formally exhibited student assessment work during and at the end of the teaching periods. In some cases, staff members’ was also displayed and published. When shared studios are provided for students, projects on display throughout the semester make student progress visible. In these situations that support awareness of learning, the work exhibited is usually completed for assessment by individuals and is viewed predominately by the academic and professional communities. However, the general public are often given access to lectures and seminars held at the universities, although these offerings may be limited when they form part of a formal architectural education program.

Awareness of group and self-development is supported by the design of the built environment when spaces accommodate opportunities for learning activities to be viewed passively, without requiring participation. As such, when exhibited outcomes are viewed by individuals from multiple groups, the opportunity to disseminate information, share events and inform and engage with other individuals and communities increases. Passive design strategies (e.g., increased transparency of facades for better daylighting) make the learning
more visible to the general public, which increases individuals’ awareness of other learning activities and encourages interaction with others.

The learning activities and group-based projects that require collaboration prompt people to come together. At Rural Studio, when projects are developed in groups, the technique of collective drawing captured individuals’ ideas, which were tested by the group. The drawings were a demonstration of progress and formed part of the final submission for students’ assessment. The knowledge gained by different groups was collated and documented for subsequent groups to use and build upon. The visible progress of longitudinal projects requires a stable educational context, whereby single projects could be embedded across many years.

When individuals compare their progress to others, the pace and progress of projects can be measured against others and the characteristics of the learning experience adapted. When working together in groups on project-based or problem-solving activities, the scale of the social groupings is critical. In small groups interaction between individuals is facilitated and decisions are more easily made. At Rural Studio, smaller groups were accommodated when larger projects, such as the Farm Greenhouse, were broken into smaller components that could be completed within a semester or year.

Different types of formal and informal activities enable information to be shared between or within social groups. At VUW, the ongoing informal display of work by the students was observed as students displayed sketches, models and works in progress wherever there was an available flat surface. The learning was more evident to the student and their colleagues. As such, individuals became more aware of the learning development of themselves and others.

When the outcomes of the learning experiences were presented, it was observed that students learned from this display individually and with their peers. While the outcomes were exhibited, individuals looked at the different solutions developed by others and questioned their decisions as they compared the work of others to their own. When this comparison occurs in groups, individuals question and challenge each other. This—often informal—experience of peer review is most likely to occur when individuals are familiar with each other and are like-minded. These situations require comfortable and familiar gathering spaces in which individuals and groups come together to support transformation, allowing individuals to consolidate and develop new understanding. Places that have some degree of flexibility are more likely to accommodate guests who may have different requirements and abilities when communicating, sharing and challenging experiences. Adaptable spaces can accommodate either passive events (e.g., lectures and seminars) or active events (e.g., workshops and
practical experiences). In some informal activities, a public place (i.e., those places associated with a broader, like-minded community, belonging to neither staff nor students), shifts control of the space from the students and staff and can expose individuals to different practices and points of views. This diversity can be increased when larger groups are involved. In the documentation created during the visits, the levels of engagement were high when the learning, which, focused on consolidating new positions, took place in small groups.

The benefit of the learning experience is more likely to be shared when interactions include discussions and peer teaching in small groups. At Rural Studio, small groups of two to four students worked together to explore given design issues and presented their findings to the whole class. Students resolved these issues in multiple units, often in different groups. As the projects progressed, the students developed personal points of view. Students referred to work done by them and others as part of the ongoing documentation they were required to prepare for their studies. At VUW the observed levels of engagement were high and individuals shared information generously when collaborative projects included peer reviews of assignments and peer discussion. A sharing of benefit within like-minded groups was observed elsewhere in the VUW program. At informal events (e.g., professional networking events) staff, students and members of the architectural community learned from each other and gained new and different insights.

It was difficult to find evidence of collective decision-making in the online survey of the selected architectural programs. However, limited electives within the programs, the structure and nature of the experiential learning opportunities and the priority placed on individual assessment are considered in this thesis to limit opportunities for collective decision-making. This is because collective decision-making requires time and space for groups to explore a topic in-depth.

The experience of learning-by-doing observed at Rural Studio was observed in other architectural education programs. However, the learning for the third-year students was focused on a single longitudinal project, typically for the Rural Studio community itself. Tasks undertaken as part of the studio work related directly to the understanding of a shared problem. The less formal exercises (e.g., the yard work activities), related to students’ own development, which they would rely on later in semester, as they explored their individual capacities and skills. Students could control the level of difficulty and pace of development to suit their own needs. Students were passive as they watched others complete tasks and active as they took part in practical tasks to be completed. Students understood the relevancy of these tasks as the fifth-year students completed outstanding projects nearby using the same skills. Some of the tasks were remedial and involved correcting the work done by previous
students. As such, the lesson about the effect of decisions and responsibility for actions was explicit. In formal learning situations, students planned their experiential learning, by simulating future action with drawings and models. Their decisions could be discussed with staff and tested in theory before real action was taken. Similar passive learning took place in the structural workshops, wherein students designed a roof structure, calculated expected results, and physically testing the models.

Situations in which every-day activities were shared and reviewed by others (e.g., presenting a food diary) contributed to the development of common understanding, as individuals reflected on their own real experiences and the shared experiences of others. The communication ability and collaborative skills of the students became important when students collected, synthesised and presented their findings as a group.

The nature of the projects at Rural Studio required students to understand of the needs of others as critical to the Rural Studio project. This project aimed to provide reciprocated benefit for the community. Students developed communication, collaboration and critical thinking skills when their design decisions were tested against given rules (e.g., building codes) and the performance of the design was simulated. When the learning outcomes of previous years informed the current research and testing, students benefited not only from sharing information, but also from the way in which this information was shared (i.e., the modes of communication used). In these situations, skill development was more explicit and students were prompted to reflect upon and develop their own skills.

**D.3.3 Activities that Sustain Change**

Activities that sustain change deepen individuals’ understanding of self and others. The development of a new sense of self and others is influenced by time and the intensity of the experiences. Activities that form part of the transformative experience provide opportunities to reflect and share using common languages and engaging communication. Consequently, relationships between those involved in the activities are strengthened. Transformation can be sustained by activities that strengthen individuals’ sense of self and their relationship with a clearly defined community (see Table 27). When the shift in world view has resulted in a new understanding of self, the positioning and relationships with existing communities can be affected and thus, new relationships must be established within the new community if the transformation is to be sustained. The sharing of personal experiences, whether real or simulated, and reflection on these shared experiences reinforces these relationships and contributes towards the understanding of self and of others. Activities
in which the content is closely related to an immediate task can also reinforce new relationships and world views and sustain change, as the new world view is applied and tested in other situations.

In the documentation of the selected architectural education programs, the campus-based programs, and those programs taught in dedicated buildings demonstrated a strong academic community identity. When local practitioners and alumni teach, the identity of the professional community is strengthened. Individuals develop a complex sense of self as they become a part of many communities during their learning experiences.

Table 27: Characteristics of Activities that Sustain Change: Sense of Self and Collective

<table>
<thead>
<tr>
<th>Experience</th>
<th>Opportunity</th>
<th>Element</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities that sustain</td>
<td>Developing sense of self and collective</td>
<td>Context</td>
<td>Gathering spaces—places to come together</td>
</tr>
<tr>
<td>Activities that sustain</td>
<td>Experience—shared/personal; real/simulated</td>
<td>Participant</td>
<td>Scale of social groups</td>
</tr>
<tr>
<td>Activities that sustain</td>
<td>Relevancy of content to immediate task</td>
<td>Interaction</td>
<td>Understanding via real or virtual experiences</td>
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</tbody>
</table>


The gathering spaces at Rural Studio offered different places for groups to participate in both planned and impromptu learning activities. The Great Hall at the Rural Studio Farm was used primarily as a communal eating place, where staff and students came together to share a meal regularly. At other times, this area was used as a temporary workspace while nearby projects were constructed. As a completed design-build project, the Great Hall served as a teaching resource, demonstrating the scale, complexity and skills of previous students. The Great Hall is a reminder of the longevity and the shared goals of the Rural Studio program.

In the small, intense Rural Studio community, a strong sense of collective identity was observed in both formal and informal activities. This sense of community was strengthened when learning activities were conducted in groups. During the case study, different models of peer learning were observed. The multiple roles of individuals, as novice and expert, were made explicit. The collective identity was strengthened in a small town community; newcomers were easily recognisable and the Rural Studio students were easily identified. As
the shared benefit of previous completed projects meant that the connections between the community and Rural Studio were positive, new students were proud of their Rural Studio identity. The Rural Studio experience included social gatherings outside formal class time. The different social groups within the Rural Studio community (e.g., students, staff and the local community) came together at communal dinners, regular sporting activities (e.g., ultimate frisbee) and part-time employment at local businesses. These real experiences of everyday activities extended individuals’ understanding of the known world of others beyond the design-build projects.

Within a larger community, the identity of smaller groups can be reinforced by sharing the benefit of learning, which increases understanding of the nature of the different situations that exist within the communities. At Rural Studio, the community that students were learning to understand was their own, as they worked on the Rural Studio Farm. Previously, students had worked on design-build projects for the broader community (e.g., the housing projects at Masons Bend and Greensboro, and numerous facilities at Lions Park—a community sporting area). Through these projects individuals’ gained an understanding of communities that were new to them. However, understanding the Rural Studio Farm community required students to critically reflect on their own individual and collective needs. The potential for transformation was increased as individuals challenged existing personal and shared values.

Gathering spaces provide places to come together, extending the learning beyond the classroom through real and shared experiences. Guest lectures, public seminars, and publications are common methods of sharing experience. In the documentation of the selected architectural education programs, learning-in-place was common as many of the programs included off campus activities. Some of the activities in which experiences were shared were traditional in their pedagogical approach in which the student was the novice, and the expert was a member of staff or a community representative. When it is unlikely that roles will shift during the learning activity, student engagement can be limited. However, engagement is strengthened when experiences are shared in different formats, using modes of interaction other than the visual or spoken.

At the University of South Australia, a design-build project in Papua New Guinea, conducted as an elective with the school, was exhibited near the entry of the Kaurna Building on the City West campus. The exhibition was located on an internal boundary (i.e., an internal wall, dividing public and private space) in the lift lobby. This location allowed for casual and impromptu viewing of the work. The exhibition was temporarily fixed directly to the face of a concrete wall, resulting in a less formal appearance, which suggested that displays in this area are rapidly replaced and that many learning experiences could be easily shared. Similarly, the
scale of the space and location of gathering spaces can support the accidental viewing of displayed work. When visiting the case studies of architectural learning, observed locations included near building entries, circulation spaces and lift lobbies. Gathering spaces also provided places for those interested to come together formally and share their experiences directly through conversation and storytelling.

When the scale of the social groups was inappropriate (e.g., too large to support meaningful connection), it was observed that individuals would ameliorate the situation by breaking into smaller groups. At VUW, an exhibition of an overseas field trip was observed as a typical example of sharing experiences. In addition to the static images displayed on screens, videos of the trip were also screening, accompanied by culturally relevant food (i.e., local cuisine from the tour) and information about the University’s overseas exchange programs. Recreating experiences in diverse formats (e.g., visual, audio, and culinary) recreated a multisensory experience. When combined with an avenue to create future personal experiences, this type of experience increases an individual’s motivation to learn differently. The shift from gaining knowledge through known-of experiences to creating knowledge through experiences of their known world increases the potential for the self-world to also shift, prompting transformation.

Gaining new understanding through virtual experiences is often the aim of exhibitions, but the shared experiences are likely to remain in the known world. Providing motivation and prompting commitment from individuals can support their participation in future activities. Many tourists, academics and architects visited Rural Studio to see the design-build projects completed by students. This can be challenging for some visitors because in some cases, the real situation of the project (i.e., the surrounding environment and the condition of the building) is different to the one published or expected. By visiting these projects visitors were led through environments and situations they may not normally encounter. However, this experience is typically fleeting, as many visitors do not stay long; their attention is tightly focused and there is little opportunity to discuss projects with the original occupants or the students themselves.

Opportunities for increased relevance and immediacy of application of learning were observed in the documentation of the selected architectural education programs. The activities documented included the use of guest lecturers, evidence of cross-curricular learning, the timetabling of concurrent activities for multiple subject areas and optional learning activities in which theoretical knowledge was applied. The type of learning experience (i.e., the context, the people and the interaction that occurs) must be considered as the new understanding is applied to familiar contexts. To sustain transformation, familiar design
strategies and language in the built context reinforces new experiences, allowing the change that is made to become familiar. Learning within a social like-minded group, comprising others with similar experiences, sustains the relevancy of the learning.

Being-in-place (i.e., learning from experiences of the known world) requires extended visits to one place, multiple visits to the same place, or visits to multiple but related places. These visits enable real-world examples to be personally experienced and connections to be made. When visible examples of the practical application of theory are provided, a strong relationship between the built and educational contexts and the participants is promoted. This was observed at the University of South Australia’s Mawson Lakes Campus. The materials used on the exterior of the Materials and Science Centre Building reflected the research taking place within the building. Similarly, at the City West campus, the exposed services and materials (e.g., off form concrete panels) displayed the design strategies that were taught as part of the architectural and sustainable design curriculum within the Kaurna Building.

The scale of social groups influences the effect of real-world experiences. While experiences can be shared meaningfully in small groups, larger groups provide a greater number of diverse experiences. The timely integration of different sized groups within a learning activity can heighten the potential for transformation. At VUW, activities with large groups, (e.g., lectures) where followed by classes in which small groups discussed the content of the lecture in relation to their own works in progress. As such, the timing of the activities within a learning experience is important. This importance was also observed when the role of participants shifted from novice to expert, as their knowledge and skills increased. When the knowledge of the known-of world—learned in large groups from experts—is promptly applied through action, this knowledge is more easily transferred to the known world. This was observed at Rural Studio, as students demonstrated newly mastered skills to others. At VUW, students reviewed each other’s work—providing feedback and sharing knowledge—as part of their own assessment.

Higher levels of thinking (i.e., metacognitive processes) are likely when the relevancy of the learning activity is explicit. At Rural Studio, the fifth-year students participated in a structure workshop at the time when key decisions about design intent and materials were being made. In these classes, students developed design, communication and technical skills while applying knowledge of the known-of world to their own projects. A guided exploration of local buildings was part of the first third-year history class. In this activity, students gained an understanding of their built and social context through direct experience. In the following design classes, it became clear that this knowledge was critical to their design project.
Architectural learning that contains these types of experiences are likely to prompt, support and sustain transformation in response to changing contexts. In the documentation of the case studies of architectural learning, transformation of this nature was observed in the individual and within the learning system. The methods of documentation applied during this study have demonstrated how changes in the learning system (i.e., individual immediate change, local change in the intermediate term, and long-term, systemic change) can be recognised. It is important that staff, students and communities learn to recognise and respond to change, so they can become more resilient and adaptable to change. The framework of transformative experiences has informed the discussion in Chapter 7 as to how such transformative experiences can be embedded into existing architectural education programs and practices. Transformative experiences in architectural learning enable designers to think critically about their experiences and set collaborative goals with others in response to problems or issues that arise. A common language is developed collectively by communicating ideas and concepts in ways that are easily understood by others from new and unfamiliar contexts. The change that occurs within a dynamic system can be contextualised and understood through reflection and the sharing of experiences. Embedding these learning strategies in architectural education can enable those involved to develop the ability to respond to change in the future. Additionally, it can support a flexible, but purposeful, positioning of world view that engenders decisions that are of mutual benefit to self and world.
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Sustaining Learning: Transformative Experiences in Architectural Education

PART THREE: Publications

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Preface

The following publications have been listed chronologically to illustrate the progression of ideas and theories. These publications demonstrate how my academic and professional practices and my worldview have transformed along my journey from teaching practitioner to research academic. This transition has been both rewarding and challenging. Publishing early on this journey with teaching colleagues has developed my pedagogical practice. Co-authoring with academics outside the field of architecture offered new ways of thinking about learning and developed my understanding of the challenges of reflective practice. My position on architectural learning was strengthened in response to the feedback received from reviewers publishing my initial theories and findings in educational journals. Sharing experiences of teaching and learning in professional environments with colleagues has extended the possible applications of my new knowledge. Throughout this research, I have been prompted to reflect on the successes and difficulties faced by myself, my colleagues and my students, in the learning experiences I have created.
A REFLECTION: TRANSFORMATIVE ASPECTS OF TEACHING BUILDING SCIENCE TO ARCHITECTURE STUDENTS

(Karol & Mackintosh 2010)
ANALYSING THE LACK OF STUDENT ENGAGEMENT IN THE SUSTAINABILITY AGENDA

(Karol & Mackintosh 2011)
ARCHITECTURAL EDUCATION AND BEHAVIOUR CHANGE: THE ROLE OF THE CRITICAL REFLECTIVE JOURNAL IN DESIGN

(Mackintosh 2011)
REFLECTIVE CONNECTIONS FOR STUDENT SUCCESS IN AN UNDERGRADUATE ARCHITECTURE PROGRAM

(Grellier & Mackintosh 2012)
MIRROR MIRROR ON THE WALL: HOW SELF-REFLECTION CAN CONTRIBUTE TO THE DESIGN PROCESS

(Mackintosh 2013)
JUST DOING IT: THE ROLE OF EXPERIENTIAL LEARNING AND INTEGRATED CURRICULA IN ARCHITECTURAL EDUCATION

(Mackintosh 2014a)
LEARNING TO CHANGE TOGETHER: THE SOCIAL CONTEXT OF ARCHITECTURAL LEARNING

(Mackintosh 2014b)

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LEARNING TO CHANGE: TRANSFORMATIVE LEARNING IN ARCHITECTURE

(Mackintosh 2014c)
LEARNING ARCHITECTURE: SUPPORTING POSITIVE CHANGE

(Mackintosh 2016)
FACILITATING TRANSFORMATIVE EXPERIENCES: CASE STUDIES FOR SCHOOL DESIGN

(Mackintosh, Creagh, and McGann 2017)
LEARNING ABOUT ARCHITECTURE: THE ART OF MAKING AND BEING

(Mackintosh & Philips 2017)
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