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The Cultural architecture of schools: a study of the relationship between school design, the learning environment and learning communities in new schools

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The Cultural Architecture of Schools
A study of the relationship between school design, the learning environment
and learning communities in new schools.

A thesis submitted in partial fulfilment of the
requirements for the award of the degree

Doctor of Education

from

University of Wollongong

by

Kathryn Bertram
Masters of Education (Leadership & Administration); Bachelor of Arts;
Diploma of Education (Secondary); Graduate Diploma of Museum Studies with
Merit

Supervisors: Associate Professor Narottam Bhindi & Professor Jan Wright

December, 2012
Thesis Certification

Certification

I, Kathryn L Bertram, declare that this thesis, submitted in partial fulfilment of the requirements for the award of the degree Doctor of Education, in the Department of Education at the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Kathryn L Bertram
18 June, 2012
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Abstract

A substantial body of literature describes the aesthetic and visual impact of architecture in contemporary schools, the processes by which architects apply personal and professional knowledge to the design of educational facilities and the ways in which educators use buildings to deliver curriculum. Despite the growing body of literature, few empirical studies have researched the impact school building design has had upon the creation of effective learning communities within schools.

This study sought to address this gap in the school design research by investigating the relationship between school design, the learning environment and learning communities in new schools. The study explored the way in which the design of physical space and the creation of a learning culture is negotiated, factors that influence the design of schools and the intricacies of how educational facilities influence learning cultures. This research also considered the influence of leadership on the creation of effective learning environments.

I used a multiple case study approach with three K-12 schools from the New South Wales non-government sector. Data was collected through a number of methods, including surveys, interviews, photographs and observations. The data was systematically analysed using a constant comparative method. The findings of the study were compared to the current literature on learning communities, leading to a framework or model for articulating the relationship between the built environment and learning community cultures. The study also identified the importance of school context when designing its learning environment and certain key influences on learning environments, especially the impact of constraints, masterplanning and affordability. The perspectives of each of the stakeholder groups (teachers, students, college managers and educational leaders) of the learning spaces varied according to the role these spaces played in individuals’ daily work lives. Through cross-case comparison, the study identified a number of factors that contributed to building effective learning environments. These factors were: information technology resources; space; flexibility; control and physical comfort. The research also
highlighted the impact a collaborative style of leadership and the centrality of the role played by the school principal in the design process.

There are a number of recommendations that have been made as a result of this study. The most obvious being the need for increased teacher training and professional development programmes in the area of using space as part of a pedagogy and the development of policies relating to the establishment of new schools that take into account an individual school’s context when designing the learning environment. The study also proposes a model for understanding the relationship between the physical learning environment and the classroom by positioning the student and their learning at the centre of the relationship.
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I also thank the Principals of Acacia, Grevillea and Jacaranda Colleges, who helped make this research project possible. I appreciated their enthusiastic support and willingness to allow these schools to be part of this study. My colleagues, who encouraged my work through long conversations about schools, built environments and their own experiences of the architecture of schools. My family, who assisted with proofreading and words of encouragement along the journey.

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Chapter One: Introduction

In this chapter, I will explain the background to the field of school architecture and my interest in school design, as well as provide an overview of the purpose, methodology and research focus of my study. The chapter also provides my definition of school architecture, the key research questions and concludes with a diagram that explains the organisation of the study.

1.1. Background to the Study

Educational leadership and administration literature reflects an increasing interest in understanding and cultivating rich learning cultures with schools. Factors such as pedagogy, leadership style and workplace organisation have been identified as key to creating and enhancing effective learning communities. Architects have written extensively about contemporary architecture for public and commercial constructions, as well as philosophies of design such as “fit for purpose” and “less is more”. Both academics and consultants specialising in the process of educational facility design have written about the planning process and the relationship between an architect and a client. Amidst all of this literature, the voices of the educator and the student are less common. Concepts and philosophies, such as the Reggio Emilia movement that is based upon the belief that buildings are “the Third Teacher” and the “open plan classroom” of the 1970s, have reflected the educator’s priorities. However, architects’ design expertise and knowledge of building construction have dominated in the conceptualisation of design templates for physical learning environments, even in the discussion of the pedagogical role a physical space could play in a children’s educational experience.

As discussed further in Chapter 2, much has been written about school design in terms of physical and aesthetic factors, links between pedagogy and the physical layout of a classroom, learning communities as a 21st Century approach to learning and convivial workplaces. In comparison, less has been done in term of research
studies in schools that would enable us to go beyond broad discussions of general trends and description rich summaries of specific building projects as exemplars of current designs. Small amounts have been written about the influence of the physical environment on effective learning communities and the role of leadership in creating the physical learning environment. Studies that consider the physical learning environment within whole school contexts are also few, as are research studies of Australian schools.

1.1.1. A brief history of school building design in Anglo-Western countries since the Industrial Revolution.

To understand the current literature in the area of contemporary school design it is important to have a general overview of the history of school building design in Anglo-Western countries. By Anglo-Western, I mean countries that were either once part of the British Empire or whose colonial background led them to adopt educational systems similar to the British one. Therefore, countries like Australia, Canada, New Zealand, Hong Kong and the United States of America share similar educational systems and histories of school architecture.

Historically, schools have architecturally and organisationally resembled institutions instead of the types of places where children learn when not at school, for example their homes and neighbourhood playgrounds. Scholarly works that trace the history of school design, such as *Architecture of Schools: The new learning environments* (Dudek, 2000) and *School* (Burke & Grosvenor, 2008), explain how the roots of modern school architecture for mass education are found in the newly industrialised society of the nineteenth century. The histories of school design usually explore the evolution of the school building, the threads of continuity in designs, the dilemmas faced when change is resisted and often conclude that programmes amount to little more than old ways in new buildings. What is particularly interesting about the history of school building design is the persistent belief in an active and influential link between buildings and pedagogy and student achievement. Each era has argued
for the suitability of a particular standard school building to deliver, or at the very least facilitate, the dominant pedagogy and curriculum of the time.

The late nineteenth century school in England served as a beacon of civilisation in the community and a dignified public building. As education was extended beyond the privileged classes with the introduction of compulsory education in 1870, the architectural features and presentation of the school’s physical edifice were designed to raise the aspirations of those who were receiving the new education (Burke & Grosvenor, 2008; Dudek, 2000). The same trend was also evident in the United States (Tanner & Lackney, 2006). These were “modern” schools for the masses on a large scale, due to the introduction of compulsory education for children between five and thirteen years of age. When the pedagogy of schooling had developed to the point where students were divided into age cohorts, instruction was usually didactic\(^1\) and rooms were assigned to cohorts, with up to sixty children per room and rooms were arranged along corridors or around central halls (Burke and Grosvenor, 2008). All students were to receive a compulsory, basic education that was designed to make them literate, numerate and with a general knowledge relating to the natural world, history and the Christian faith. Additional domestic and trade skills were also important in the curriculum, as was moral education. The days and years were timetabled into a series of systematised activities and exercises. School life was regimented and was controlled by time. This approach to schooling and design was evident across the British Empire and the United States and was recognisable in the architecture of schools constructed through this era. It is important to note that school buildings, like other public buildings, represent considerable capital investment and were built to last for many generations. Widespread government funded building programmes tended to come in waves and usually involved rolling out standardised designs. Privately funded schools could build according to their own finances and

\(^{1}\) Didactic referring to the teaching style that is typified by students accommodated in desks facing the teacher giving instruction from the front and a blackboard mounted near the teacher. The room was organised “so that each child was able to see the teacher and the teacher to command the attention of each child”. The focus was upon ordered and regulated learning controlled by the teacher (Burke & Grosvenor, 2008, pp.51-3).
timeframes, but as with state funded schools, the buildings were required to endure for many generations of students (Dudek, 2000; Tanner & Lackney, 2006).

After World War I, school building design in the West was influenced by the modernist school of architecture (Hertzberger, 2000). When new schools were built, the designs began to incorporate new materials like steel. A new approach to education was being advocated and “the materiality of school would, it was suggested, play a crucial role in enabling new forms of pedagogy to flourish, shifting the gravity from the teacher to the child” (Burke & Grosvenor, 2008, p.69). There was an increasing interest in “whole child” education, and the educational agenda was expanded to include the child’s social and physical well-being (Tanner & Lackney, 2006). The outbreak of World War II suddenly curtailed school building programmes and developments in new approaches to education. After 1945, building programmes had new problems to solve in nations affected by the war, not least of which was providing new schools in response to the growth of suburbia, the increase in the number of school aged children and the replacement of war damaged schools or redundant late nineteenth century buildings (Burke & Grosvenor, 2008).

The early twentieth century buildings were viewed as “plants” providing universal education. They were structures with a functional layout and a deterministic programme, which meant classrooms were uniformly organised around a didactic pedagogy (Hatch, 1997). A standard design for the general teaching area was established and reproduced room after room, with covered corridors or walkways connecting the rooms. Students sat in desks that were arranged to face the main area of instruction, usually a blackboard at the “front of the room”, with display boards placed on the walls side and back walls. Class groups were organised according to age would spend the day receiving instruction from their assigned teacher in isolation from other classes. Elements in the design that would enhance the efficiency and uniformity of education were emphasised, for example, the provision of the same furniture in every classroom. Elements within the design that promoted healthy and hygienic conditions, such as opening windows and tiled or wooden floors, were favoured (Dudek, 2000). The “egg crate” design is a common description for these
industrial era schools. As new building materials and construction methods, such as colour-bonded aluminium cladding, factory-built modular units, acrylic paints and a range of metals and plastics, became available the fabric and look of the school facilities changed but the philosophy behind the design did not shift until the implementation of child-centred pedagogies a generation after 1945 (Burke & Grosvenor, 2008; Darling-Hammond & Friedlaender, 2008).

Throughout the twentieth century, modern architectural design principles and changing pedagogical approaches and curriculum led to different designs, for example, the open-plan classroom (Brogden, 2007) and the use of modular steel furniture. With new engineering, windows could be larger, air conditioning could be installed to assist with climate control and with a range of new electric lighting options, illumination of classrooms could be controlled. The experimentation with child-centred pedagogies challenged the industrial model of education, as did the introduction of new information technologies (Tanner & Lackney, 2006). Classroom designs needed to accommodate computers, data projectors and cabling for networks and internet access. These digital and information technologies did much to influence the need to change classroom design in the last decade of the twentieth century and the availability of new building materials enabled these changes to occur.

1.1.2. A summary of the current state of research in the field of school design at the turn of the twenty-first century.

The literature in the area of educational facilities design and the built environment for schools is both vast and fragmented, and will be explored in greater detail in the next chapter. Broadly speaking, the literature can be grouped into three types, with the first type using the notion of the classroom as a “Third Teacher” constituting physical space as an active agent in the learning process. This type recognises the building as a silent teaching partner and the purpose of good design is to remove hindrances to its voice and influence. The second type focuses on educational facilities planning and approaches design in a more pragmatic manner. The emphasis is upon isolating specific design elements that are common to all school structures
(for example, lighting and passageways), quantifying the impact of these elements upon some aspect of schooling (for example, student levels of achievement), with the aim of making design responses to standard elements more predictable and streamlined. The third type of literature discusses the educational contexts and agendas that have been observed as having, or are predicted to have, a significant impact on what can be achieved in the overall building project, as well as being the reason for the project in the first place.

Studies in the area of school design have researched specific aspects of these three categories. Broadly speaking, the studies have considered issues such as the links between work satisfaction, teacher retention, teacher and student performance, morale and student academic achievement and specific elements in the design and condition of school buildings (Buckley et. al., 2003). Some literature describes the dissatisfaction experienced when a design has been found to be inadequate by those who use the facilities or when designs have been the result of back-mapping to other agendas, such as government funded economic stimulus or refurbishment programmes. In these types of cases, buildings are often demonstrated to have an impact that can be negative (Schnieder, 2003). Other studies lend support to conclusions about the impact of buildings on teacher morale (Ben-Peretz, 1996), student morale and well-being (Bishop, 2010; Higgins et. al., 2005; PricewaterhouseCoopers, 2010; Rudd et. al., 2008; US Department of Education, 2004), learning and achievement (Earthman, 2002; Fisher, 2005; Fisher, 2007; Young, 2003) and student behaviour (Bishop, 2010; US Department of Education, 2004).

The potential of buildings to influence pedagogies is also widely discussed but not all current pedagogies are explored or researched and, as my literature review in Chapter 2 will explain, a robust body of research has been slow to emerge over the past decade. In particular, little is known of the impact the built environment has upon learning community culture within a school. There is also uncertainty surrounding the specific role leadership plays within the process of creating physical learning environments that will support learning community cultures within
contemporary schools. Therefore, my research focused on this gap within the literature.

1.1.3. Positioning my research within the field and a gap in the current literature.

There is a growing body of research in the field of school design that indicates there is a link between educational facilities and student learning and teachers’ levels of satisfaction. However, given the size and scope of the field, research is still sparse in many areas. It is evident that the literature in this field is commonly underpinned by a profound belief that school design matters (Woolner, 2010). Woolner, a British academic from Newcastle University, argues there is widespread belief that physical environments make a difference but that currently research that identifies or measures how much difference and what sort is limited. In her 2010 publication, *The Design of Learning Spaces*, she traced the history of the belief in the significance of the physical environment in the learning process beginning with the United Kingdom’s post-1945 wave of school building to the current “Building Schools for the Future” (BSF) programme. Woolner comes to the overall conclusion that learning environments are key elements in the complex relationships and dynamics that are schools and learning and that some of the distinctiveness of a school design may be related to organisational, rather than architectural, features.

Some research has been able to demonstrate that physical environments have an impact by isolating specific elements of built environments, especially in the context of refurbishment or rebuilding programmes through post-occupancy evaluations. Therefore, researchers have been able to draw some conclusions about the impact of these specific elements on student learning outcomes. Studies (for example, Earthman, 2002, 2004; Tanner, 2008) demonstrate a positive relationship between improved adequacy and conditions and levels of student achievement and improved behaviours. However, studies that have identified factors that influence the creation of learning communities are few. Case studies and longitudinal studies are less numerous, as are studies that consider the relationship between the built environment
as an integrated entity, rather than focusing on the impact of specific design elements within the structure. Much of the research and scholarly commentary is inconclusive when it comes to the big picture and whether or not designs might foster or influence certain learning cultures.

My study sought to explore a gap in the research by investigating the relationship between the physical environment and the learning culture of a school through an examination of the bigger picture of a design’s functionality from a variety of different perspectives from within schools, rather than isolating specific design elements for evaluation. I strived to study each school as a complete entity, where a community of learners functioned within a specific physical space and environment. The literature also reveals a need for further studies of schools within the Australian context and the impact educational leadership has upon the design of learning environments. This study sought to address these aspects as well.

Another reason why I chose this specific area to research was based upon my professional experiences that have spanned over twenty-five years as a teacher and a school executive and my academic interests and studies, including master studies in leadership and two museum internships that focused on the design of exhibitions and spaces for student learning. I have watched the schools in which I worked exercise both great freedoms and great restrictions with new buildings and the design of the school environment. The Principals have been in an enviable position to drive the design of educational facilities for these schools, although facing unenviable compromises, due to shortage of funds and the long and protracted process of executing staged development.

As a result of my experience as a teacher and a student, I believe there is a link between space and pedagogy. However, I also feel a sense of dissatisfaction that a deep understanding of the dynamic that exists between the learning environment and the process of learning eludes us still. In my experience, when architects explored the design of schools, a sense of form over function dominated and when the educator responded, the focus was the opposite. The literature describes and observes the
impact of form and function on one another, but there is a sense that this is only the outer layer of a complex, possibly chaotic, network of relationships that may determine the impact of a particular design.

1.2. Purpose of the study

There is a profound belief that building design has an impact upon what happens within that built environment and on those who use this environment. A school’s architecture is believed to have an impact upon teachers, students and learning culture. The belief that the physical learning environment matters is evident across a number of disciplines (for example, architecture, education, spatial geography) and is based upon experience, observation, instinct and extrapolation of what is known about the influence of space and architecture in other contexts.

My research project considered the reasons why the physical learning environment matters by exploring how it matters in the context of schools. Therefore, the purpose of the study was to investigate the relationship between school design, the learning environment and learning communities in new schools. The study also explored the use of pattern languages for negotiating the design of physical space and the creation of a learning culture within a school.

1.3. Research Questions

To implement the purpose of this study, a number of research questions were posed. These questions were designed to investigate the ways in which the physical learning environment matters, and by using this understanding, consider whether or not we can predict or determine how that environment will affect learning.

The key research questions were:
1. What are the intended outcomes of school design from the perspective of stakeholders and in relation to the specific school contexts? (Stakeholders are educational leaders in the school, teaching staff, students and architects.)

2. What are the key influences on the design of school architecture and use of educational facilities?

3. What is the relationship between architectural and design factors and the development of an effective learning environment?

4. How does the leadership in schools influence the design of physical learning environments?

1.4. Significance of the study

The study specifically investigates the relationship between school architecture and learning communities, using contemporary pattern designs as a language for interpreting the built environment, thus contributing to the small body of literature that explores the link between the educational facilities and pedagogy. The study also uses the perspectives of students and teachers, voices that historically have not been included in studies of school design, and thereby “close-in on real-life situations and test views directly in relation to phenomena as they unfold in practice” (Flyvbjerg, 2001, p.82).

1.5. Overview of Methodology and Research Design

This was an unfolding study involving multiple case studies, one pilot and two main studies. Each case study was a school. Initial research questions were refined in the light of the first case study, which was conducted as a pilot study. All three cases were totally independent of one another. I collected information concerning the
contexts of each school and its physical and historical setting prior to visiting them. It was important to place the participants in context, and specifically, in relation to the process of establishing a new school, including its facilities and pedagogy. The criteria for selection of the case were as follows:

1. The school must be new, which means established or “relaunched” during the past 10 years. The school culture, therefore, should still reflect the foundational principles and vision. The teaching programmes should be responsive to most current pedagogy and curriculum documents;

2. The school leadership team was directly responsible or was substantially involved in the design and construction of the new school. Therefore, data concerning foundational vision and building briefs should be more readily accessible from those most directly involved;

3. Leadership claims a vision for the school in line with the definition of a learning community and an innovative learning culture. This vision needs to be clearly visible in documents and community understanding.

1.6. Assumptions.

I anticipated an iterative, cyclical process of posing questions, enquiring and reflecting (Yin, 2009). Although the study emphasised the physical environment, my focus was on the human activity and what could be learnt rather than proven about the relationship between environment, behaviour and learning culture. As Flyvbjerg (2001) states, “Predictive theories and universals cannot be found in the study of human affairs ...” (p.73). My study relied on an assumption that effective school design is the collective vision and achievement of a group of stakeholders, who are engaged together in the action of collective meaning making. I also assumed my extensive professional experience in schools would equip me with valuable insider understanding of school contexts and New South Wales pedagogy.
My research choices were in contrast to unstated positivist paradigms, such as an assumption there is a truth called “best design” and constructing buildings is the way of determining or revealing this truth, which is evident in the work of many architects who design educational facilities (for example, Bergsagel, 2007; Nair & Fielding, 2007; OWP/P Architects, 2009). I believe my project’s “way of seeing” will lead to a genuine explanatory framework that is more than simply a rich description (Flyvbjerg, 2004; Silverman, 2007).

1.7. Delimitations and Limitations of the study.

The study is restricted to one sector of the New South Wales Education system. Due to my selection criteria for schools, the case studies were drawn from the non-government sector. Therefore, the study may not be generalised to schools from the government sector.

While all three schools were Kindergarten to Year 12 co-educational schools, in two of the case studies I only surveyed students in middle school years (Years 5 and 6). Therefore, some findings based upon student responses may not be generalised to junior and senior secondary schools.

1.8. Defining a key term: school architecture

For the purpose of this study, the terms educational facilities and school architecture and the built environment will be used as interchangeable terms. School architecture will be defined as:

- the placement and definition of gardens, ovals and playgrounds;
- all built structures found on the school site, such as classrooms, office areas, library, halls, corridors and specialist learning facilities;
- elements of architectural decoration, décor, interior design features and styling;
• the physical layout of the entire site, which represents the relationship between visible elements and components.

1.9. Organisation of the study.

The remainder of this study is divided into the following chapters: Chapter 2 reviews the literature; Chapters 3 and 4 explain the theoretical framework and methodology of the study; Chapters 5, 6 and 7 present the case studies’ results and Chapter 8 summarises and discusses the results. The following figure describes the scope and sequencing of these chapters. The dashed line indicates the methodological and theoretical interaction that exists between the individual case studies before the findings of all three cases are discussed in the final chapter.

![Figure 1: Organisation of the study.](image-url)
Chapter Two: The Literature Review

2.1. Introduction

In this chapter I present an analysis of the current literature surrounding school architecture. The analysis examines how the body of writing and research revolves around factors that have an impact on school design, the links between the condition of educational facilities and student learning outcomes and the importance of the educational facilities design process itself. The literature relating to educational facilities design also highlights the role played by evaluations in defining good design and isolating specific design elements that appear to impact on teaching and learning. Future designs can be and have been influenced by the results of these evaluations. Much of the literature in the field speculates on possible causal links between building design, pedagogy and student outcomes (Behrenbuch & Bolger, 2006; Design Council, 2004; DEST Schooling Issues Digest, 2006; Earthman, 2002; Fisher, 2005; Learning Through Landscapes website, 2006; Kube, 2006; Taylor, 2000). The nature of this research tends to take the form of reviews of current literature, summaries of best practice and experience-generated recommendations. In addition to these reviews, there are also large-scale evaluations of government funded building programmes in the United Kingdom and New Zealand. Some of these findings have triggered building programmes and innovation in design. Much of the literature makes the point that school design is not a science (Young, 2003). Even though research has explored aspects of the relationship between school building design and learning outcomes, we are far from understanding the dynamic in its entirety as well as specific causal factors. However, in the past ten years research studies have been growing in number and give support to the conclusions that physical environments have an impact. The research also suggests that an explanation of the exact causes of the impact of school design is complex and varies according to context (PricewaterhouseCoopers, 2010).

A point that requires clarification relates to the term “educational facility design” in the literature. This term refers to the design of physical learning spaces, interior and
exterior structures and buildings that comprise the built environment. It includes the entire master plan for the site, as well as the placement of all the individual elements that constitute a physical space. Therefore, the design and evaluation of a school’s facilities could focus on the overall master plan with a particular emphasis upon the big structures, or it could equally focus on the individual elements such as lighting or décor or traffic areas. The design of the large structures (for example, a library) and the small components (for example, a classroom’s lighting) are considered both for their integration into the whole design of the built environment and for their specific, individual function. A school’s design could be evaluated as being ineffective due to inappropriate placement of the buildings on the site in relation to other facilities, but an effective design in terms of the buildings’ specific features. Hence, when the literature refers to school design, it could be focusing on the whole or the individual elements of a school’s facilities.

2.2. The impact of school design on learning, teaching and school culture

2.2.1. Large-scale literature reviews

During the past ten years, there have been a number of large-scale evaluations of building programmes. Government authorities have also commissioned a number of reviews of the current literature in the field of school design, often during the planning stages for these capital investment programmes. At this point, I will consider what the literature tells us about the relationship between school facilities and student learning outcomes, as well as the role educational facilities design processes play in creating conducive learning environments.

The New Zealand Ministry of Education commissioned a study (A. C. Neilson, 2004) that investigated the impact of classroom design on achieving positive student learning outcomes with the purpose of understanding what key stakeholders consider to be the essential elements of good design. The findings of this study identified four physical environment and facility factors that were recognised as affecting learning.
These factors were: the ability to control the temperature; proper lighting; adequate space for the learning tasks being undertaken; and having necessary equipment and furnishings readily available. The study also found that four design elements in the built environment were identifiable as having some influence on learning.

“Although there has been little research into links between learning and design, four elements appear to be predictors of successful student learning outcomes: technology for teachers; clearly defined pathways for movement around the school; a positive, friendly and welcoming atmosphere; and a positive relationship with the outdoors, so that the school sits comfortably in its environment” (p.3).

In reference to the physical school environment and its impact upon learning, the review identified four factors that linked to features of facilities and four design elements in the built environment that were significant. According to the review, these factors were recognised as having an effect on learning. The elements appeared to be predictors of successful learning outcomes.

In 2004, a team of researchers and academics at the University of Newcastle-upon-Tyne prepared a literature review for the Design Council in the United Kingdom. This review focused on the impact of school environments. The review observed, “[t]he science of designing learning environments is currently remarkably underdeveloped” and “designing a room for learning is very complex”. The review observed there is a distinct absence of “research on effective learning environments” (Higgins, et. al., 2005, p.3). The review divided the school environment field into four areas: systems and processes; products and services; environment; and communication. These areas were subdivided into five categories of impact. The review looked “at the effects of changes in the learning environment on teachers and learners” (p.10) and considered a wide range of literature. This review found “[t]he empirical research that exists on the impacts of environment on teaching and learning tends to focus much more upon some elements (for example, noise) and fails to synthesise understandings ... our evaluation suggests that the
nature of the improvements made in schools may have less to do with the specific element chosen for change than with how the process of change is managed” (p.6).

The researchers concluded “[i]t is extremely difficult to come to firm conclusions about the impact of learning environments because of the multi-faceted nature of environments and the subsequent diverse and disconnected nature of the research literature” (p.6). Much of the research they reviewed focused more upon some specific elements than the whole and usually failed to synthesise understandings. Whilst there is clear evidence that extremes of environmental elements have negative effects on students and teachers, Higgins and his colleagues concluded it is difficult to find reliable evidence of a definite effect on achievement, and “while there can be a dynamic relationship between environment and behaviour, it is not automatic” (p. 7).

Carmona and Carmona (n.d.) collated a bibliography of research available prior to 2003 on behalf of the Commission for Architecture and the Built Environment. The bibliography examined the value added by good design in five key areas of public sector interest, one of which was education. The aim of the bibliography was to provide a robust evidential base for decision making and support for the argument that better designs add value and are worth investment. The bibliography provided a comprehensive summary of studies in the field of school design, but came to no firm conclusions in relation to school design.

2.2.2. Evaluations of capital investment programmes and educational facilities

Capital investment programmes

Around 2006, the United Kingdom commenced the extensive “Building Schools for the Future” (BSF) programme. This was a government funded secondary school refurbishment programme. Through this programme vast amounts of money were invested in educational facilities within the space of a few years, and the programme’s goals echoed the profound belief that physical learning environments
had an impact on learning and the new facilities or refurbished buildings would be better suited to the demands of 21st Century schooling.

PricewaterhouseCoopers were responsible for conducting three annual evaluations of the BSF programme, the last of which was published in 2010. Of the many objectives for the BSF programme, a number were germane to my study: to make school environments the best place for children to learn the skills and ideas that shape their lives; to provide schools with the opportunity to design a school that will achieve the goal of educational transformation, and schools should inspire learning (PricewaterhouseCoopers, 2010, p.14).

In the third evaluation PricewaterhouseCoopers (2010) stated two objectives of the evaluation were to assess the impact of capital investment (as represented by BSF) on educational outcomes and to identify causal mechanisms by which capital investment impacts on educational outcomes. PricewaterhouseCoopers’ extensive research activities included school site visits (n=27) that involved a total of 146 interviews with a range of staff, a survey of all head teachers from schools currently involved in the BSF programme and a student survey administered in 29 schools. Data were analysed (using the student survey and a national database relating to young people in English) with the aim of examining “the early impacts of BSF on intermediate outcomes (behaviour, attendance and attitudes to learning)” (p.ii). They reported some link and impact was evident but not causal or specific in type or magnitude of impact. The evaluation found, “[h]eadteachers believed that educational transformation requires a pupil-centred focus, including greater personalisation of teaching and learning and improving the life chances of children” (p.ii), which is a very general statement and not particularly revealing about school design. However, PricewaterhouseCoopers also reported,

“Over four-fifths (81%) of headteachers agreed or strongly agreed that BSF will contribute to educational transformation in their school. In addition, three-quarters of headteachers agreed that BSF has more potential to deliver educational transformation than previous capital investment
programmes” (p.iii)

and

“headteachers are confident that BSF can contribute to raising standards in school and beyond, by extending the benefits of their facilities to the wider community” (p.iv).

These findings suggest that buildings matter in some significant way. The evaluation came to the overall conclusion that a range of things, not all of which were architectural elements, make a difference. However, the evaluation was not definite in terms of why and how these things make a difference. The researchers made a series of recommendations relating to a diverse range of elements, such as: the influence of school context; understanding what educational transformation means to teachers; and the impact the elements may have upon the effectiveness of educational facilities.

The BSF is an example of large scale investment in schools by the government. One researcher who has found evidence of the impact investment has on student outcomes is Crampton (2009), an academic from the United States. She has looked at the impact investment in human and physical capital has on student achievement. Her study found investment accounted for somewhere between 55 and 77 percent of variation in student achievement in the 4th and 8th Grades in the areas of reading and mathematics, with human capital investment consistently the largest influence.

**Evaluations of educational facilities and the impact on student achievement**

A recent review by the American 21st Century School Fund (2009) looked at nineteen studies that had been conducted in the United States since 2000, with 58% being published between 2007 and 2009. All of these studies looked at the impact of buildings on students and teachers. Fourteen of the nineteen studies (74%) focused on facility condition as the independent variable type (21st Century School Fund, 2009). Two studies included in this review, one by Tanner (2009) and the other by Hughes (2006), exclusively considered design. The distribution of these studies support the observation that research in this field has been slowly but steadily
accumulating in more recent years. This review also suggests that, in the United States, research in this field has focused on school facility condition and its impact upon student achievement rather than the impact of a choice of design.

Part of the belief that physical environments matter is an assumption that school buildings can exert a direct influence over or have a measurable impact on student achievement and learning outcomes. The literature that explores this area posits a causal relationship. Glenn Earthman, an academic in the field of school planning in the United States, has researched and written on the impact facility quality and condition has upon student performance and teacher effectiveness. He states that “[b]ased on my own studies, my review of pertinent studies, and my background and experience in the field, my conclusion is that school facility conditions do affect student academic achievement” (Earthman, 2002, p.1). In one report (Earthman, 2002) based on his own research and a review of pertinent research in the United States, Earthman comes to the conclusion that buildings can have both a negative and positive impact upon student performance. In buildings where there are deficiencies relating to thermal quality, acoustic quality and school building age, he argues students “are definitely handicapped in their academic achievement” (p.1). In another study (Earthman & Lemasters, 2009), Earthman looked at the connection between classroom conditions and teachers’ attitudes by surveying 165 teachers in Virginia. The research found that in schools whose conditions were rated as satisfactory, teachers were significantly more likely to express positive attitudes about their classrooms than those in unsatisfactory buildings. Earthman (2009) also reports a significant percentage of teachers in both satisfactory and unsatisfactory schools wanted to have some control over their teaching spaces that would enable them to adjust some features within those spaces. This study also had a poor response rate from teachers, which he suggests was because of a range of reasons, such as promotion of the project by the principal.

Jeffrey Lackney, an American academic in the field of architecture, who specialised in facilities design and planning, also focused on the quality of the school
environment and its influence on student learning outcomes and student/teacher attitudes. In the action research study he conducted for his doctoral thesis (1996), Lackney found that,

“some teachers lack adequate knowledge about how to effectively utilise, maintain and manage classroom space to support their instructional efforts, such as with cooperative learning strategies. In addition, although teachers do not have a strong sense of control over building functionality and crowding/spaciousness, they expect their school administrators to address these issues through educational policy.” (p.272).

He identifies ten specific environmental quality attributes (such as building functionality, classroom adaptability, physical health and comfort) that teachers perceived as having varying degrees of influence on educational outcomes. In his summation, Lackney concludes,

“Although there are many similar perceptions among schools in this study, there was not found to be a universal set of environmental quality attributes that all schools experience equally ... This finding supports the premise of this dissertation that environmental quality in schools can most accurately be defined within a particular context.” (pp.262-3).

Another point of discussion that occurs within the evaluation literature is the notion of educational adequacy, which has been defined “as the degree to which a school’s facilities adequately support educational goals and activities.” (Lackney, 2001, p.3). Post occupancy evaluations are one way of researching the effectiveness of design and tend to look at the relationship between adequacy for providing the curriculum and the conditions within the physical environment. Evaluations can also be linked to the original design brief. Specific elements, for example lighting or colour, are evaluated in order to understand the impact of the facility. An inadequate element in the design may be due to redundancy or the age of the facility or poor design in the first place. Schools are not always new projects, and therefore, research has often
been conducted on refurbished or remodelled facilities. Therefore, adequacy to support the curriculum is used as a measure of a school’s design and individual elements are evaluated to establish the adequacy of the design. Two quantitative studies by Earthman and Fisher (2002) sought to establish a causal link between building condition and learning outcomes as measured by test scores. The studies did show test scores can improve depending upon the condition of the environment but the studies did not control for any other variable or factor. Young (2003), an American research consultant and scholar, suggests one of the reasons research has not been able to establish causality is due to the subtle and sustained nature of the influence built environments exert. The influence is quite difficult to measure with precision but experience suggests it exists. He argues that only in a few cases can a direct causal relationship be established between a single variable and learning or achievement.

Two studies in the United States that investigated the relationship between facility design and student achievement were Tanner (2008) and Hughes (2006). Tanner (2008), an academic who works in the field of facilities design and planning, compared student achievement with three school design classifications: movement and circulation; day lighting and views. The study involved a sample of seventy-one schools in Georgia (USA). Using a ten-point Likert scale, participants were asked to rate thirteen design patterns that related to the three design classifications listed above, for example, pathways as related to movement and circulation. Measures of the three school designs were compared to students’ learning outcomes as determined by the results of the state’s basic skills tests. Tanner found there were effects of all three designs on student test scores. In all the basic skills, except for Social Studies which reported no effect, at least one school design classification had a significant influence. He concludes, “[i]f this study is replicated with parallel findings, then a case can be built that the documented effects were not just random occurrences” (p. 394). In her doctoral research project, Hughes (2006) sought to determine if a relationship existed between school facility design variables and student achievement as determined by the Texas Assessment of Knowledge and Skills and Tanner’s
Design Assessment Scale for Elementary Schools (1999) with a sample of twenty-one urban schools. She concluded that all the building design variables included in the study (for example, movement patterns and views and colour schemes) had a statistically significant relationship with student achievement but there was not a statistically significant relationship between building design variables and school ratings2. Her conclusions support current literature in this area of investigation.

In 2004, Earthman was asked to “review the 31 criteria for school facilities established by the Maryland Task Force to Study Public School Facilities and to recommend priorities for those criteria in light of the available research on the links between conditions in school buildings and student achievement” (Earthman, 2004, p.8). After reviewing the current research literature, Earthman concluded there was ample research that demonstrates the link between student achievement and the condition of buildings, with performance levels lower in older facilities. Earthman also concludes, “most of the older school buildings and those buildings in poor condition are located in areas of greatest poverty” (p.9). This suggests the links are potentially more complex than a direct cause and effect relationship and additional factors may be significant, for example, inequity of facilities or disadvantage amongst the student population. Earthman (2004) argues it is most important to address facility issues related to student health and safety, and correlates this argument with the criteria research has indicated as having the most impact on student achievement, that is: human comfort; indoor air quality; lighting; acoustical control; secondary science laboratories; and student capacity (ratio of student numbers to size of available facilities) in both elementary and secondary schools.

In 2004 Lippman, an American architect, studied the “fat L” shaped classroom design pattern (proposed in 1994 by architect, James Dyke) and its effect on the quality of the learning that takes place within this particular type of classroom (Lippman, 2004). The purpose of this analysis was to understand how this design pattern might influence learning. The “fat L” classroom sought to provide

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2 Refers to the Texas Education Agency annual rating (Exemplary, Recognised, Academically Acceptable).
multimodal learning that was flexible, integrated, variable and manageable by a solo teacher. It provided five corner spaces that were connected but also separate, with a mix of permanent and temporary activity settings. The L-shape both enabled and signalled different learning approaches but Lippman found the space challenged teachers to rethink delivery, as well providing some design solutions to other modes of learning. Lippman suggests the “fat L” could be understood as a layered system of private and public settings within one space. As a design pattern it “is a viable plan and attempts to promote a theoretical framework in the design of learning environments” (p.9) but there were concerns that related to a teacher’s control of the environment and, therefore, related back to a teacher’s pedagogy and its relationship to the physical space. Lippman concluded these concerns may not be valid according to research findings. However, he also suggests that they could be real in the teacher’s view and that some Post Occupancy Evaluations (POEs) of the “fat L” classroom were needed. Other specific classroom designs have also been analysed. For example, Woolner (2010) in her review of the literature in the area of school design since 1945, found that “[t]here is a reasonable body of research, from the UK and US, which examines how open-plan schools are actually used and a major conclusion is that the design does not determine the teacher’s practice, with wide variations in how open-plan space is used.” (p.9).

The notion of architectural determinism

A focus on the notion, or possibly assumption, that a form of architectural determinism exists is also evident in the educational facilities design literature. This is based on the assumption that new buildings will generate or modify new behaviours, attitudes and cultures. A corollary of this is the idea that outcomes will be positive and could not be achieved without the change. Some educational facilities design studies look into the link between school design, teacher performance, collegiality and student learning outcomes and possible links between levels of teacher satisfaction, building condition and teaching facilities. There is some data from studies that focus on specific elements of design, how people respond to these elements and how people view the potential of these elements.
These studies look for influences on attitudes, morale and behaviours that enhance learning, such as attendance and retention rates.

The impact of the environment on teachers’ work and students’ attitudes
Schnieder (2003) conducted a large sample study of United States teachers, who were asked to rate their working conditions and how they perceived these conditions affect their job performance and teaching effectiveness. He concluded facilities have a direct effect on teaching and learning, and in particular, poor conditions make it more difficult for teachers to carry out the work. The effect of facility condition and how it manifests itself in a variety of behaviours, such as retention, has also been studied. A study conducted by Rudd, Reed and Smith (2008) sought to demonstrate the difference BSF schools made to young people’s attitudes towards education and learning, as measured by levels of engagement and enthusiasm for school. The data was collected in two rounds of surveys in one school. Findings indicated that student attitudes had become more positive after moving into the new buildings, but the study took no account of other variables or influences. A case study of three new high schools that opened in Virginia between 2006 and 2007 was conducted by an American academic, Michael Bishop (2010). The focus of this doctoral research was the impact of new school facilities on morale, attitude and student achievement. Using document analyses, principal interviews and three focus groups, Bishop found improved student behaviour, improved student and staff morale when building stock was replaced. At the same time he found that data collected from both principals and teachers indicated there was an absence of belief that new buildings had more impact than the old buildings, that is, newness of the facility was not the determining factor. Instead, participants in all three focus groups cited major design elements such as the amount of natural light incorporated into the overall design of the building, the amount of open space available in the hallways and commons areas for students, as being the most significant or influential factors. This study implies refurbished buildings could achieve similar positive effects on achievement, morale and attitude if the condition of specific design elements is improved.
One study (Ben-Peretz et al., 1996) explored the role of a teachers’ lounge on improving learning environments, and in particular found there was a correlation between the influence of a teachers’ common room on school domains (areas of school life and work) and the social function of the common room. The study found, “the lounge has the potential to fulfill an important role in strengthening the links among the different units, promoting a more cohesive school ethos which is conducive to school improvement and effectiveness.” (p.149)

However, the study also concluded there was an overall lack of correlation between the political and work functions and the perceived influence of the lounge.

Buckley, Schnieder and Shang (2003) conducted a study of factors that influenced staff retention and found school facilities was a significant factor. The study also found school managers had some control over school facilities, potentially leading to a conclusion that something can be done by the managers about unsatisfactory facilities. Issues of collegiality, leadership, community and teacher identity have been picked up in these studies.

**The notion of place attachment and impact of school climate**

Another way of thinking about the relationship between the design of learning facilities and the impact of those facilities is the growing body of literature that explores space and the notion of place attachment. McGregor, whose doctoral thesis focused on spatiality, argues space is relational and made through interactions (2003 & 2004). Her empirical work focused upon teacher workplace culture. McGregor used micro-ethnographic methods of investigation to “elicit the subjective meanings people attach to events and spaces” (p.356). Through two school case studies, McGregor explored spatiality using a topological approach. On the basis of this study, she argues for a more dynamic and open conceptualisation of space. The case studies challenged notions of schools as self-contained and static entities. McGregor argues institutions are “continually being produced by interconnecting relationships and practices which extend in space and time” (p.353).
Another study, conducted by researchers Uline, Tschannen-Moran and de Vere Wolsey (2009), looked specifically at the mediating impact school climate had upon the relationship between educational facilities and student learning outcomes. Using case studies of middle schools in the United States, these researchers explored the intricacies of the influences on this relationship. The study found inhabitants of the learning environment did influence the place they occupied and the reciprocal was also true. The learning climate of a school was influenced by an ongoing interaction between the original design of the built environment, the daily reality of that environment and the occupants of that environment. Broad themes central to this interaction were movement, elbow room, aesthetics, light, flexible responsive classrooms and security. The study suggested occupants valued some degree of control over comfort and use factors in their environments. Leadership that encouraged occupants to own their spaces was a critical attribute of climate and community was the keystone that locked all the aspects of school climate together. This study concluded the relationship between the physical environment and learning was complex, based on many interrelated components. The relationship was also reciprocal in its impact and interactions.

2.3. Educational facilities design: the design and evaluation process

A body of literature on the field of school architecture revolves around the process of designing and improving educational facilities and learning environments, including the examination of new building projects, as well as refurbishments. It also discusses the role played by collaboration between a designer and client school. Traditionally the design process has been dominated by architects but the current literature suggests this needs to change, if pedagogy and design are to work effectively in the physical learning environment.

Approaches to designing school environments have seen some change within the past decade, with the client participating more actively in the process. In the case of schools, the client varies depending of the type of school system. Architects and
educational stakeholders are facing the challenge of forming new collaborative design teams and seeking more participatory processes. An observation that can be made of the literature on educational facilities design relates to the authorship of the writings and studies. Two distinct and unrelated professional groups author a considerable amount of the educational facilities design literature yet approach the topic from different areas of expertise and different relationships to the purpose of schools. They are either academics from the field of architecture and architects with a focus on the physical environment (for example, Alexander, 1979; Kube, 2006; Bergsagel et al., 2007; Day, 2007; Nair & Fielding, 2005) or educational academics and educators with a focus on the pedagogy and context of schools (for example, Burke & Grosvenor, 2003, 2008; Bickford & Wright, 2006). The former group tends to see schools as clients with a design problem to be solved and the latter sees the other as an expert who will assist in a specific and highly technical area of school creation. In addition to these two main contributing groups of professionals and academics, another influential group has contributed to the body of literature from time to time. These authors are government authorities and independent bodies commissioned to research or evaluate a specific aspect of educational facilities design as it relates to a specific or proposed policy in the area of education. For example, ACNeilson completed a report for the New Zealand Ministry of Education in 2004 and PricewaterhouseCoopers conducted ongoing research for the British BSF programme. The issue of there being a cross-disciplinary element to this field of research was raised in one review conducted by American academics from the fields of psychology and e-learning Graetz and Goliber (2002), when they concluded that most of the empirical literature looking at the “how” and “why” questions of school design was to be found in environmental psychology.

There is also a distinct absence of writing by classroom teachers. Kenn Fisher (2002), whose doctoral research considered the pedagogy of space in schools, investigated why teachers largely ignore the physical environment as a key influence on learning, despite his conclusion that school spaces are not “innocent or neutral” (p.viii). One reason, he concluded, may be the “hegemony of the design professionals who, by controlling the design process, by excluding user input and
participation, remove spatiality from the domain of teachers and students” (p.ix).
However, despite the potential exclusion of teachers and students from being
involved in the design of space, Fisher’s research found that students and teachers
can articulate a spatial understanding which relates to their everyday lives and
identities within the school environment. Fisher argues that most research up until
2002 had emphasized the measurement of quantitative outcomes rather than coming
to “a qualitative understanding of the important organizational, pedagogical and
curriculum issues” (p.20).

On rarer occasions the voices cross over groups and when this occurs the discussion
deepens and reveals the complexity that lies at the heart of the relationship between
design and learning. One example is the work of Melbourne architect, Andrew
Bunting, whose doctoral study in education sought to identify the significant current
societal and educational trends which will influence secondary school building
design in the 21st Century, and to consider what impact they will have upon building
design (Bunting, 2006). Bunting used a Delphi survey that involved three rounds of
questions using a panel of 46 expert educators and architects, who had experience
with school design, from Australia, the United States of America, Europe, New
Zealand and the United Kingdom. Bunting’s doctoral study had three findings of
importance to my study:

“Firstly, there was a high degree of consensus from panel members to all
responses at the close of the Third Round3. Secondly, there were a high
number of responses where the ratings for the desirability-of-occurrence
significantly exceeded that of the ratings for the probability-of-occurrence.
Finally, there were few significant differences in ratings between the
architects and the educators” (p.100).

Bunting also found responses highlighted “the concept of the ‘community of
learners’ within the school, the relationship of school to the external community and
the impact of student assessment” and “the panel recognised the shift in education to
student centred learning as opposed to standardised provision” (p.101).

3 Third Round refers to the third set of responses collected by email from the participants.
The reason I raise the point about authorship and the rarity of cross-discipline literature is due to the cross-disciplinary nature of my study. While it may seem obvious that educationalists would be interested in the educational facilities process, the literature suggests the school and the educator have taken the role of the client in this process. Until recently, this role distanced them from the design process and control of the buildings that are constructed. This aspect was particularly investigated in the Jacaranda College case. It is true to say that the literature reflects a growing interest in the use of a more collaborative approach to the design process. Specific projects, such as Joinedupdesignforschools programme (Sorrell & Sorrell, 2005), have shown how a more collaborative process can involve teachers, students and designers at the early stages of planning. The Joinedupdesignforschools project was designed by the Sorrell Foundation with the purpose of giving British school students the opportunity to become the clients of world-renowned designers and thereby collaboratively develop design concepts that would improve their own schools. One outcome of the project was the observation that students had “shown us [the Sorrells] that if you really listen to them, they know better than anyone what the key issues are in their school environments” (p. 6). However, there is still a substantial percentage of school building projects or existing buildings that have not been built in a collaborative nor consultative manner. Therefore, I argue that the school design literature still tends to fall into separate disciplines, with less written about learning spaces by those who use the spaces. The next section will pick up on this issue of collaboration and consultation between the architects and educators further.

Recent literature in the areas of school design reflects an increasing enthusiasm for collaboration between schools and architects and a participatory design process. The value of including the “voice” of all stakeholders is increasingly emphasised. Words like democratising, distributive, collegial, collaborative and partnership, as well as phrases such as “whole school”, reflect these perspectives. However, participatory design processes such as client teams are relatively new in the world of educational facilities design. Whilst there is a growing body of literature describing the processes (Burke & Grosvenor, 2003; OWP/P Architects, 2009; Sanoff, 2000; Sorrell 2005; Tanner & Lackney, 2006), limited empirical evidence is available to validate
conclusions implied in some literature that these processes can establish which
design works best to achieve a certain impact. Descriptive accounts of the design
process, usually from the perspective of the architect or design team, appear in
architectural and educational journals supporting this perspective (Featherstone,
2010; Fielding et. al. 2006; Hallisey, 2007; Jackson, 2007; Rule, 2007). However, if
these accounts are based more upon anecdotes, professional experiences or data
gathered from unstructured observations and therefore empirical rigour cannot be
presupposed, evidence for best design remains limited. In 2004, Pullen and Bradley
pointed out the same situation existed in the field of physical workplaces and social
workplaces. There was scant data to analyse and therefore understand the relative
contribution of investment spent on “meaningful modernisation” in the workplace
(Pullen & Bradley, 2004, p.70). They point to a substantial reliance upon experience-
based reasoning.

Within the general school design discussion there is an implication that built
environments and physical facilities can develop or establish desired school cultures
and that a type of architectural determinism can prevail over school cultures and
instigate planned change. This approach gives limited consideration to the view that
a school’s culture is something that is negotiated and constructed by the school itself.
Some recent studies have sought to research the negotiation of learning culture by
using the voices of community, staff and students. For example, Linda Ellison (2006)
examined the experience of one school in the United Kingdom that underwent
privatisation and re-establishment through “the perspectives of students who had
attended both the new college and the school from which it emerged” (p.227).
Amongst other change factors, Ellison considered the link between building
refurbishment and school culture. She concludes, “structures are relatively easy to
manipulate and are visible but, for structures to effect change, it is also necessary to
attend to the underlying culture” (p.232). Ellison also discusses the issues associated
with seeking student perceptions in a research study, for example, the feasibility of
accessing large groups of students. It was a relatively novel study for its time because
it elicited the views of school students, a group rarely included in evaluations of
school facilities.
Other researchers have also considered the inclusion of stakeholders like students and teachers in the design process and how the inclusion of students’ perceptions may have an impact on school design through the evaluation process. British academics, Flutter and Rudduck (2000), considered student perspectives in their research and concluded the “traditional exclusion of young people from the consultative process, this bracketing out of their voice, is founded upon an out-dated view of childhood which fails to acknowledge children’s capacity to comment upon issues affecting their lives” (p.86). Cindy Beacham’s (2006) exploratory study investigated the need for communication support between designers and child development professionals during the pre-school design process. As Goldberg points out teachers are typically “aware of the needs of children and adults, but either feel they are unable to clearly communicate the needs to design professionals or are not invited to participate” (Goldberg, 1997 quoted in Beacham, p.40). Beacham adopted a multi-method, qualitative approach to her research design using focus groups and individual interviews, but only adults participated in the focus groups and interviews. The focus groups revealed that both designer and clients needed to know more about key issues in both professional areas, that there was a need for “open and competent communication skills” (p.41) and that more input was required from all stakeholders. Interviews revealed the need for a common language that would be understood by both design and child development professionals and could express aspects of design and the needs of stakeholders. Beacham noted the deficiencies in communication between the participant groups did not seem to be based on a “lack of willingness to communicate, but result more from a lack of understanding about the level of communication necessary” (p.42). She concludes that there is a need for “interdisciplinary understanding” (p.43).

An Australian architect, Mary Featherston, has considered the inclusion of teachers, students and educational leaders in the process and has written on concepts such as “fit for purpose”, function over form and the link between new buildings and new cultures (Featherston, 2009; 2006; 2010). She advocates an “inside-out” method,
where pedagogy and classroom practice shape the design. She also sees learning spaces and learning culture as negotiated by the teacher, student and the spaces:

“[t]he building shell and settings are relatively permanent, while the last layer [loose items, resources, equipment] is less so, built up over time by the inhabitants. It’s this last layer, which expresses the identity of a particular community, reflecting their backgrounds, interests and developing ideas. This is a most significant layer that it builds familiarity, emotional attachment and a sense of belonging.” (Featherston, 2010, p. 48).

Both Tanner and Lackney, American academics who research in the fields of education facilities planning, have written extensively about the role clients can specifically play in the planning process. They advocate participation of all stakeholders in the process, and argue that whilst design solutions should be based on client briefs, they must also be well reasoned and sound from a design point of view.

2.4. New designs for schools in response to contemporary contexts and transformational agendas

In the final section of this chapter, the literature review looks at the contemporary context and the agendas that have had an impact on the design of school. The literature looks at how design is linked to change agendas within society, the economy and government policy. New designs have come about in part due to necessity, in part due to evaluations of previous building programmes and in part due to expectations that new ways will happen in new places.

When reviewing the literature, I noted clusters of writing on the impact of new designs commonly occur when one or more of the following circumstances or influencing factors exist. These circumstances/influencing factors are: when there is significant financial investment in school stock, especially by centralised authorities
such as federal governments; when there is a major innovation or era shift, such as Web2 information technologies; and when there are substantial shifts in educational thinking and pedagogical approaches, such as collaborative learning. In the light of these factors, facilities can be perceived as inadequate for supporting the resultant change and transformational agendas. The turn of the 21st Century is one such time with the concurrent influences of the end of the Industrial Age model for the economy (Hargreaves, 2003, 2009), the emergence of new information technologies and substantial school stock investment programmes in the United Kingdom, Australia and parts of the United States.

Contemporary educational agendas belonging to a range of stakeholders, such as governments, policy makers, school systems and authorities, educators and academics and society have an impact upon the process of designing schools. The stakeholder driving the agenda may be a national government or an educational authority or a more localised entity, such as a school’s community. For example, in the 1970s, studies considered the success of the open-plan classrooms that were designed in response to the Plowden report in the United Kingdom. Researchers found, however, the “link between open-plan buildings and child-centred practices is, at best, tenuous at the classroom level” and “central intervention in the work of schools does not necessarily produce the desired effect” (Brogden, 2007, p.62). Brogden reported open plan schools were no guarantee of open or informal teaching and the studies of the Plowden era “demonstrated major contradictions between the rhetoric of child-centeredness and the realities of the organisation of teaching in the open-plan schools whose design had been promoted by Plowden and encouraged by government incentive” (p.62). “The teacher must change before development may take place” was one of Brogden’s “uncomfortable conclusions” (p.64).

2.4.1 How these agendas are working in the contemporary context

More recently school design has been impacted by transformational and reform agendas that have produced large capital investment programmes such as the Building Schools for the Future (BSF) in the United Kingdom and the Building the
Education Revolution (BER) in Australia. The BSF programme was linked to *Every Child Matters: Change for Children*, a national framework for local change programmes to build services around improving outcomes for children and young people. A review of the literature surrounding the BSF programme suggests that the new designs have been made possible by the following circumstances: research into the impact of capital projects at school level, especially in the areas of creating community and improving underperforming or failing schools; shifts in pedagogies that are increasingly responsive to a world increasingly influenced by new digital technologies; and a decision to invest substantial funds in a widespread capital works programme. These are circumstances that Hargreaves (2009) has described as enabling the shift from the Industrial Age model to a new era based on the emerging technologies. Woolner (2010) identifies three similar agendas in the broader educational sector that have had an impact upon school design, these being: the transformation agenda; the Information Communication Technology agenda; and the inclusion/transparency agenda.

PricewaterhouseCoopers identifies and discusses three key features of educational transformation in their 2010 evaluation of the educational transformation goals of the BSF building programme. These features are: schools at the heart of their community; transforming teaching and learning; and raising aspirations, achievement and attainment. Since the BSF programme was based on changing the physical environment, the implication is that there is a belief that a positive link exists between educational transformation and the design of school facilities, whether or not this link is causal in nature or simply enabling other processes is not clear. The Australian Building the Education Revolution (BER) programme has not yet been evaluated in terms of an educational transformation agenda.

Researchers have also been questioning the solutions that have been proposed in response to the reform and transformation agendas. John Mitchell (2008), a British architect concludes, “[t]here is a real danger that the programme will produce either brighter, newer, shinier schools organised around an outdated learning (teaching) paradigm or alternatively more innovative buildings which struggle to co-exist with
an unchallenged teaching culture.” (p.244). He predicts transforming education will involve radical change and building programmes could either operate as catalysts for this change or prevent it by being too visionary without necessary changes in practice. The transformation agenda could be implemented too early in the physical environment, that is, before changes in school culture, pedagogy and classroom practice have occurred. Wilks (2010), an Australian researcher, discusses this problem by drawing on David Perkins’ (of the Harvard Graduate School of Education) concept of “troublesome knowledge” (quoted in Wilks, 2010, p.39), that is, where specific knowledge does not have a known organising principle. She says teachers and students need opportunities to practise with the new spaces, with the movable aspects of the spaces and there is wisdom in letting the arrangement of these elements emerge from the pedagogy rather than the other way around for “[i]f change involves initiatives about how rather than what people teach, they must be involved because it affects the foundations of their practice. Changing where they teach shakes the foundations even further” (p.42). Therefore, Wilks says,

“[the] kind of troublesome knowledge that change agents in schools are dealing with when they ask teachers to conceptualise spaces, design desired teaching spaces or read plans for meaning, could be seen as what Perkins describes as ‘alien’ knowledge that comes from a perspective that conflicts with one’s own perspective. Teachers facing such knowledge are experiencing a conceptual gap” (p.40).

Despite transformational agendas, design has not necessarily kept up with multimodal technologies. Innovation in digital technologies have to some extent moved faster than innovation in education facilities design and to some extent the planning process has also been slow to include consideration of new pedagogies, technologies and stakeholders, for example, Information Technology system managers. Wilson, who was involved in a 2006-2008 research project with David Radcliffe (Purdue University) and Derek Powell (University of Queensland), makes the observation that the process of designing learning spaces has not changed significantly in the past century, despite substantial developments in technology,
changes in pedagogy and new educational agendas: “The received wisdom is that architects design spaces and teachers teach in classrooms …” (p.18). The Wilson, Radcliffe and Powell project looked at what happens in learning spaces by using a rubric that assessed the pedagogy-space-technology nexus. They observed and documented the different learning modes that occurred within a learning space, to establish dominant mode(s) of learning within a space and then assessed how the physical space and arrangement of flexible features (including furniture) worked with the dominant mode(s). They then compared their assessments with 16 other national case studies. They found designs have struggled with multimodal learning delivery. In most schools, the library has been the only space to attempt this type of design. Rebadging a space does not change its physical qualities. Wilson comes to the following conclusions,

“we’ve found that there seems to be a significant disconnect between those who teach in spaces, those who design learning spaces and those who incorporate technology into these spaces. We can see evidence of the disconnection in the language different groups use to describe and understand space … The consequence of this disconnection when it comes to designing learning spaces, we find, is variability in terms of quality, cost and outcomes of those learning spaces” (p.18).

Wilson proposes that learning spaces could be looked at as being of two types: structured with an emphasis upon teacher-led learning and unstructured with an emphasis upon self-directed or peer-to-peer learning. These spaces include formal and informal spaces. Within these spaces different modes of learning are used. Wilson concludes,

“One of the important outcomes of the research into the pedagogy-space-technology nexus has been to acknowledge context. Good learning spaces don’t just reflect a particular pedagogy in a particular place but also acknowledge the context in which that pedagogy operates” (p.22).
2.4.2. The proliferation of templates and best practice manuals

There is a plethora of “off the shelf” design templates and best practice manuals that identify features that are currently perceived as being present in successful learning environments. In addition to large numbers of commercially available books and journals sharing examples of new designs, government departments and professional organisations (such as the British Council for School Environments, the National Clearinghouse for Educational Facilities and The Centre for School Design) have made templates and case study examples freely available on their websites.

In recent years, the government departments for education in the Australian states have created websites dedicated to the Australian Building the Education Revolution, a federally funded government programme (2008-2011). On these websites are template designs for building educational facilities approved under the funding, such as halls and libraries. These electronic and print resources reflect the current state of thinking in relation to educational facility design and the policy agendas that underpin the capital investment programmes. For example, the Victorian Department of Education site (www.education.vic.gov.au/buildingrevolution, accessed 2010) has interviews with architects, who discuss the thinking and design decisions behind the templates. One architect, Richard Leonard, explains, “schools could take up any of these templates, and really, in the future adapt them, change them, move walls”, to which another architect, Stephen Turner, replies, “[b]ut it isn’t just open plan … [w]e’re talking about intelligent, active designs”. The Department for Education and Skills in England has also released publications containing templates and plans, as well as examples of schools that have been remodelled. One example is Schools for the Future: Transforming Schools. An Inspirational Guide to remodelling secondary schools (DfES, n.d).

Most of these resources are not specifically based on academic research studies and predominately offer standardised solutions to generic design problems, such as storage, flexibility within classrooms and installation of technology. The designs do not specifically take a school’s specific context or immediate needs into account. It is
also too soon for the conduct of longitudinal research studies on the emerging twenty-first century designs.

2.5. Summary

The most obvious starting points for my literature review were the key terms “educational facilities” and “school design”. The search identified any number of articles describing architecture plans and concepts, copies of blueprints, descriptions of classroom layouts, plans and lists of works relating to refurbishment, refit or rebuild programmes. The earlier literature discussed design concepts, processes and technical specifications of the buildings. There was a substantial input from commercial architects and the client-schools in the form of articles for professional journals. Some literature focused discussion around the impact a built environment has upon people and behaviour. From this literature, I identified factors that influence the design process, such as, reform and transformation agendas and the findings of prior research and post-occupancy evaluations of school facilities. A common thread evident throughout the literature was a belief in the view that buildings matter, that they fulfil an instructional role and they influence successful learning outcomes.

Despite the fact that over the past ten years research into the links between school designs and learning has grown and research evidence has increasingly pointed towards the existence of a relationship between educational facilities and learning, the mechanisms of this relationship are not clear. Building evaluation studies have isolated a number of elements within the designed learning space that, when present, have positive effects on student achievement and attitude. One recent review, “Research on the Impact of School Facilities on Students and Teachers” conducted by the 21st Century School Fund (2009) in the United States of America comments on the situation in the following way;

“There has been a slow but steady increase of research on the impact of public school facilities on educational achievement and community outcomes and of
the rigor of the research … Recent research continues to point to a small but steadily positive relationship between the quality of a public school facility and a range of academic and community outcomes” (p.2).

My research seeks to address one particular gap in the field of school design, that is, what impact the physical environment has upon learning communities. The study strives to do this by identifying the factors in the school’s culture, context and physical spaces that influence the creation of learning environments. This study considers the perspectives of a whole range of stakeholders, taking particular interest in what these people believe affects the design of a school’s learning environment.

In the next chapter, I will explain the theoretical framework that I have drawn on to investigate the relationship between the built and learning environments in contemporary schools.
Chapter Three: Theoretical Framework

3.1. Introduction

The purpose of having an explicit theory is to provide a framework for conducting research. It enables the researcher to organise a vast amount of data, concepts, ideas and principles into a meaningful form. Clearly stated theory also guides research design by providing a philosophical stance from which assumptions about the world, knowledge and reality can be made explicit. My research project drew the theory of affordances; the notion of learning communities; the concept of pattern languages and leadership theory. This chapter will explain each in turn and how they were combined to form a complex theoretical framework that supported my analyses and discussion of the relationship between the physical learning environment, learning community culture and leadership. This chapter begins with a discussion of the concept of pattern languages and the notion of learning communities in schools. These sections are followed by an explanation of the style of leadership that could have the most relevance to the process of designing and building learning environments for learning communities. The chapter concludes with the theory of affordances, which provides an understanding of the student and teacher relationship to the learning environment.

3.2. The concept of pattern languages

Pattern language is a concept that provides a system for communicating the design of physical spaces and how individual architectural aspects of physical spaces combine to achieve a specific purpose. The concept of a pattern language of space was introduced by the scholarly works of Alexander (1979) and his colleagues, Ishikawa, Silverstein, Jacobson, Fiksdahl-King and Angel (1977). At the core of their theory is the belief that people should design the places they inhabit for themselves, but in order to communicate these designs to others, including those who were able to translate those designs into constructions, a new language was required. It is
theoretically a language that would allow people to articulate a design for any type of building or environment. In the past ten years, pattern languages specifically for the design of school facilities in the 21st Century have been devised and used in school design processes by a few architects (for example, Nair and Fielding, 2007; Bergsagel et. al, 2007; Lippman, 2010).

In order to understand the pattern language concept and how it could apply to school design it is important to consider the pioneering work of Alexander. Alexander’s work on pattern languages, grew out of a desire to “understand the nature of the building process”, as well as “construct an actual, possible pattern language” (Alexander et. al., 1977, p.ix). This language provided a framework for thinking about the design of towns, neighbourhoods, houses, gardens and rooms. Alexander argues “towns and buildings will not be able to become alive, unless they are made by all the people in society and unless these people share a common pattern language” (Alexander et. al., 1977, p.x). Each pattern describes a typical problem that occurred in our environment and provided a solution, that when applied within a specific context and in conjunction with other patterns, would resolve the problem in a site-specific and unique manner. Alexander et.al. argue that patterns can be combined to build complex, successful environments. His work articulates a view that “no pattern is an isolated entity” and each one “can exist in the world, only to the extent that it is supported by other patterns” (p.xiii). Each pattern can be viewed as a rule which describes what a person has to do in order to generate a specific entity, and in its simplest form, the language is a set of elements or symbols and rules for combining those symbols. When combined these finite features of the language create fields of relationships which can take on an infinite variety of unique forms.

The process by which patterns are combined is precise but, Alexander argues, cannot be used mechanically. It is not a system learnt and applied to building environments, instead it is a language that allows for the release of human ideas, aspirations and concepts for that environment by providing a means of communication. Alexander emphasises that architects can too easily forget that environments depend not simply on the physical patterns but also on the patterns of events experienced within that
built environment. It is the combination of the two patterns of the physical and event that gives the total experience of the space: “what matters in a building or a town is not its outward shape, its physical geometry alone, but the events that happen there” (Alexander, 1979, p.65) and “the standard pattern of events vary much from person to person, and from culture to culture” (p.68). Alexander hastens to point out this does not mean space creates or causes events, simply that “a pattern of events cannot be separated from the space where it occurs” (p.73) and there is a fundamental “inner connection between each pattern of events and the pattern of space in which it happens” (p.92). In a school context, an event could be a specific lesson or activity that occurs within a specific room each day. Alexander also argues that in addition to the physical and event patterns, each building is also defined by patterns of relationships amongst and within the specific architectural elements, for example a hallway or vaulted ceiling, that constitute the physical environment.

Some of the pattern language literature makes a link between learning communities and educational facilities design. It is predominately the work of architects and designers (for example, Bergsagel et.al. 2007; Featherstone, 2010; Fielding, 2005; Hertzberger 2000 & 2008; Nair, 2007), who have assimilated their professional experience and current discourse surrounding the pedagogy of collaborative learning into a theory of design and new pattern languages for collaborative learning spaces. In a recent study, de Gregori (2007) argues for a redefinition of the discourse on school architecture. In his thesis, de Gregori found classroom organization, learning technologies and school climate were three factors that could form the basis of a conceptual framework that could advance a common language between educators and architects, but did not devise or use pattern language himself. He argues, architecture should relate to both physical and social environmental contexts of a school.

Within the literature, I did not find a pattern language that was sufficient for describing the breadth of the features and conditions present in contemporary learning community environments, so I considered two languages in the area of school design. Fielding and Nair (2007) have worked on a pattern language for
school designs based upon the concept of twenty-five patterns, including one that addresses the theory of multiple intelligences (refer to Appendix 1 for the complete list). These patterns fall into six types of patterns: parts of the whole; spatial quality; brain-based; high performance; community connected; and higher order. I used the parts of the whole, brain-based and the community connected types in particular, as they were the most relevant to my investigation of whole school design and learning community cultures. A group of American architects, Bergsagel, Best, Cushman, McConachie, Sauer and Stephen (2007), also tackled the need for a common language of design and created a different pattern language based upon small school learning models. They proposed five patterns that they suggest will enhance student levels of achievement by redefining the high school environment. These patterns are: personalised; learning-focused; collaborative; community-connected; adaptable; and flexible. I found these broader patterns actually incorporated Fielding and Nair’s twenty-five more specific patterns but not their configuration patterns. I combined the five broader patterns with three additional configuration patterns devised by Fielding and Nair to make the key patterns by which I analysed the environments in my case study schools (see the first column of Table 1).

<table>
<thead>
<tr>
<th>Key Patterns</th>
<th>Associated Design Principles</th>
<th>Examples of architectural/design features and indicators of pattern</th>
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<tbody>
<tr>
<td>Personalised</td>
<td>Site &amp; building organization</td>
<td>• Human scale</td>
</tr>
<tr>
<td></td>
<td>Character of all spaces</td>
<td>• Way-finding</td>
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<td></td>
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<td>• Distributed resources</td>
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<td>• Welcoming entry</td>
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<td>• Home base &amp; individual storage</td>
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<td></td>
<td></td>
<td>• Accessible to all abilities and mobilities</td>
</tr>
<tr>
<td>Learning-focused</td>
<td>Site &amp; building organization</td>
<td>• Signature (organisation’s identity)</td>
</tr>
<tr>
<td></td>
<td>Site design &amp; outdoor learning spaces</td>
<td>• Display</td>
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<td></td>
<td></td>
<td>• Transparency (connections visible)</td>
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<td></td>
<td></td>
<td>• Varied spaces – resource rich</td>
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<tr>
<td></td>
<td></td>
<td>• Studios and specialist labs</td>
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<tr>
<td></td>
<td></td>
<td>• Presentation areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Integrated technology</td>
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<td></td>
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<td>• Indoor/outdoor connections</td>
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<td>• Cave space</td>
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<td>• Wide range of experiences</td>
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</table>
Another way of approaching pattern languages is by devising key design principles. In 2003 Jeffery Lackney, an American academic specialising in the area of facilities planning, published a framework of thirty-three principles of educational design (Appendix 2) from which “educators and design professionals can structure the content of their educational facility development process” (NCEF, 2003, p.1). These principles were derived from the reflective practice of educators and design professionals as well as empirical research in the area of educational facilities design. Lackney claims, “Each educational design principle takes as an underlying premise that all learning environments should be learner-centered, developmentally and age
appropriate, safe, comfortable, accessible, flexible and equitable, in addition to being cost effective” (NCEF, 2003, p.1). The thirty-three design principles were grouped into six types: site design and outdoor learning spaces; shared school and community facilities; site and building organisation; planning and design process; character of all spaces; and community spaces. Whilst Lackney calls them principles, where they were similar or linked to the other patterns I included them in my criteria for analysing the schools’ environments (see the second column in Table 1). Unlike the patterns, these principles provided a link between the environment and the design process, an aspect I anticipated would be significant in my research.

In summary, I considered two sets of school design patterns and Lackney’s principles of design and identified points of agreement between the different patterns. These points of agreement formed eight key patterns that I used in my investigation of the relationship between school architecture and learning (see first two columns of Table 3). These patterns and principles have a correlation with key characteristics of learning communities. Therefore, I anticipated architecture designed for learning community cultures should follow patterns that recognise the key features of that culture. I also developed a criterion of “features” that would indicate the presence of a pattern or principle. These features are shown in the third column of Table 1.

3.3. The notion of learning communities

My investigation required an understanding of the notion of learning communities, especially in the context of schools. This section mentions the origins of the notion and definition of a learning community (Brown, 2005; deCorte, 2000; Green, 2005; Sergiovanni, 1999; Starratt, 2003), with the purpose of establishing a definition of a school learning community and the formulation of a set of criteria for identifying the presence of this type of learning culture. This definition and criteria provided me with a framework for structuring my data collection and analysis.
Whilst there is a lack of consensus over the definition of learning communities, especially in relation to schools, there are a number key ideas and characteristics that are evident in the literature. Prior to 1990, theorists such as John Dewey had identified many of the characteristics of learning communities, but the concept of a learning community as a holistic approach and set of principles in schools was not consolidated until the late twentieth century. This consolidation was in part due to a significant shift in the Western social context, as society was changing from an industrial era into the digital information era (Hargreaves, 2009; Toffler, 1985). Learning communities theory emerged in the 1990s and involved the development of an inquiry approach to teaching and learning and the establishment of a culture of inquiry within the organisation. Learning from this perspective is seen as a collaborative activity and knowledge is jointly constructed through a framework of communal values and practices.

The current literature suggests learning communities are similar from learning organisations (Senge, 1990 & 2000) and communities of practice (Wenger, 1998; Wenger and Snyder, 2000). However, communities are different to organisations. A community is a group of people with common interests and purpose, who have an identity and a sense of belonging” (Hough, 1997, p.194). If learning is to be a community based activity, then it must be acknowledged that a community is a collection of individuals who are bonded by natural will and bounded by shared ideals and ideas, and if the bonding and binding is tight enough, the “I” is transformed into a collective “we” that exists through meaningful relationships in a common place over a period of time. The nature of a learning community usually reflects “four crucial elements - agency, reflection, collaboration and culture” (Brown, 2005, p.7). Laszlo and Laszlo (2000) also described additional dimensions of a learning community as being an open, dynamic system in which individuals collectively learn and learning can be a means of change and improvement. Learning communities develop the notion “there are spaces of influence or opportunities” where the impact of people “enables learning in ways that might not otherwise occur” (Green, 2005, p.293). These spaces occur in negotiated
contexts where learners influence each other through collaboration (Green, 2005),
and can include spaces of action, explicit discourse, development and learning. Even
though these spaces are metaphoric, the design of physical spaces will have some
impact upon learning contexts and the definition of physical space.

I came to the conclusion that the notion of the school as a learning community is a
multi-faceted concept that is “focused on the culture of a school” (Johnson in
Retallick et.al., 1997, p.28). Although within the literature there is no single accepted
definition of a learning community, learning communities do share defining
characteristics and intentions (Hurd, 2004). Characteristics such as negotiation,
intimacy, commitment, engagement, supportive structures, flexible design,
community identity, research-based innovation, continual assessment and evaluation,
time, empowerment, inclusiveness, trust, communication and relationship networks
and human scale are commonly associated with learning communities. The
classroom could also be considered a micro-learning community, separate to the
school as a whole. Johnson’s and Johnson’s (1989) work on cooperative learning
underpins much of the earlier thinking around notion of classroom as a learning
community (Retallick, 1999, pp.112 –113). According to this work, this type of
classroom has five features: positive interdependence; face-to-face; individual
accountability; social skills and group processes. When I reviewed the literature on
learning communities as a whole, forty-five key characteristics emerged. These
characteristics were mentioned regularly and many were common to the attributes of
learning organisations and communities of practice. These characteristics are listed in
Appendix 3 and, even though numbered, are not in order of importance. The forty-
five characteristics were grouped into five key categories: scale; relationships;
configuration; flexibility and enquiry-based learning (see Table 2). These key aspects
formed my criteria for identifying a learning community culture and architecture that
was linked with this pedagogy within the case study schools.
Table 2: Key characteristics of Learning Communities in schools.

In addition to defining learning communities, I considered the central features of a learning community’s pedagogy. The research suggests that it would involve co-operative learning that relies upon person to person interaction (physical or virtual), individualised accountability, positive interdependence, co-operative social skills and group processing (Moore, 2000). One Australian study (Silins et al., 2002) identified four factors that form an organisational learning construct: trusting and collaborative climate; taking initiatives and risks; shared and monitored mission and professional development. However, the study seemed to be talking more about the teachers’ work than the students’ work.

The relationship between learning communities and middle schooling was another dimension of the concept of learning communities to be considered. When selecting my case study schools I negotiated the sample of student participants that would be involved in the study. In two of my cases the principals nominated class groups and teachers from the middle school (students aged 10 to 14 years of age) section of the schools (details of the specific organisational structures and sampling processes are dealt with in the chapters relating to Grevillea and Acacia Colleges). The student and teacher samples led me to consider an alignment between the learning community
and middle school literature and how a middle school could be a specific type of learning community. Researchers, such as Dinham and Rowe (2007) and Chadbourne (2001), have completed reviews of middle schooling literature. Key points raised in these reviews are similar to those raised in relation to learning communities. The middle school literature identifies middle school pedagogy as involving collaborative learning, investigative projects, inquiry-based integrated units and differentiated curriculum. Therefore, I considered the possibility that in my case study schools I was going to observe learning community culture due to its close alignment to current middle schooling approaches in Australia.

In summary, as a result of considering the notion of learning communities I developed a set of criteria and definition by which I could identify a specific learning culture. By providing a framework for learning community pedagogy, I could investigate the claim that pedagogy is linked to the physical environment. The selection of participants led me to make a link between learning communities and middle schooling, which was validated by shared characteristics.

3.4. Leadership theory

It is reasonable to assume leadership would have an impact on the design of educational facilities, especially when a design is in response to agendas for change and transformation within schools. The purpose of leadership has been articulated as leading learning, improving school capacity, creating communities of practice/learning, establishing school culture, improving student learning outcomes, managing change or managing an organisation (Duignan, 2011; Gurr, 2008; Lingard et. al., 2003; Wolcott, 1973). A consideration of the main contemporary leadership theories prompted me to question what impact different styles of leadership might have on the creation of learning environments. In determining which theory would be most relevant, it was important to establish who would be offering the leadership from within the school and for what was the purpose.
Principals

Over the past twenty years, much has been written and many research studies have been conducted on educational leadership, and in particular, the leadership of principals. Some of the earlier literature explored the leadership models that were driven by corporate management and administration practices and were much popularised and influential in the development of leadership programmes in the late 1990s. In the past decade, there has been movement away from these business administration models towards leadership frameworks that place student learning rather than the administration of an organisation at the heart of leadership practice and purpose. Leithwood, Jantzi and Steinbach (1999) summarise contemporary school leadership into six models: instructional; transformational; moral; participative; managerial; and contingent. Bass (1990) argues transformational leadership can make a difference to performance. In his review of four Australian academic journals in the years 2001 to 2005, Mulford (2007) concluded,

“Notions such as transformational and distributed leadership have strong representation in the academic literature and are argued as being key to successful schools, especially when leadership is collaborative, facilitative, and focuses on student learning and improvement” (p.16).

Gurr (2008), an Australian academic, who investigated the nature of principalship, concludes that “principals play a very important role in influencing student outcomes” (p.11). His research into current concepts of transformational leadership in education has led him to expand the notion of transformational leadership to include “responsiveness to the changing educational climate and to the school community, an accountability dimension, an explicit mention of moral leadership, and importantly, emphasised that principals are leaders of learners” (Gurr, 1997, quoted in Gurr, 2008, p.13). Of particular interest to my research project is Gurr’s observation that:

“School buildings are undergoing substantial change as opportunities arise, and in Australia we have witnessed over the past three years an unprecedented level of building of contemporary learning spaces (both new buildings and renovating of old) … For many teachers, the move to more
team-based and collaborative teaching and learning contexts will require major change to their knowledge and skills in pedagogy, curriculum and assessment, and to how they work with other teaching and non-teaching staff. The challenge is for the leaders of schools and systems to help staff develop the capabilities to take advantage of these new spaces.” (Gurr, 2008, p.17)

It is accepted in the literature (Crowther et. al., 2002; Dinham, 2008) that formal leaders must have the capacity and disposition “to deal with the wholeness of the school” (Lingard et. al. 2003, p. 74). Formal leadership roles must still exist, since schools need leaders who have the capacity to engage with the wholeness of the school and the entire educational field: “The leadership habitus of formal leadership positions recognises competing agendas, while being able to locate them within the whole, yet retaining leading learning as its core”. (Lingard et al. 2003, p. 74).

Dinham (2004) conducted a study that explored the role principals played in thirty-eight New South Wales schools that had produced outstanding educational outcomes. He found leadership was a key factor in the achievement of the educational outcomes and the exercise of this leadership was not limited to the principal. Three broad approaches were discerned in the actions of the principals of schools where outstanding sites were identified. First, these principals used their powers and the rules and boundaries of the “system” creatively. Second, they exhibited a bias towards experimentation and risk taking. Third, they exhibited strength, consistency, yet flexibility in decision making and the application of policy and procedures.

Purpose of leadership
Starratt (2003), Lingard, Hayes, Mills and Christie (2003) and Crowther, Kaagan, Ferguson and Hann (2002) all have strong arguments in support of leadership as a process of leading learning. They argue that a range of goals and actions such as productive pedagogies, building school capacity, success for all students, developing teacher-leaders, cultivating meaning, community and responsibility and conceptualising learning constitutes the essential work of an educational institution and its leaders. Leadership is seen as being bigger and more visionary than the day-to-day operations of the organisation. Starratt (2003) argues that human issues are
paramount and educational administration must centre itself on cultivating meaning, community and responsibility. Educational leadership is a moral art, has a social context and “should be shaped and directed by the essential work of learning.” (Starratt 2003, p. 5).

In the 1990s when organisation theory was blending leadership and administration within schools, Hatch (1997) made the observation that a particular style of leadership will influence the leader’s way of visualising the change, as well as realising it. She argued that organisations, including schools, need to be built for change. Hatch argues organisational stability comes through the ability to be flexible, adaptive and assimilate changes in the context that surrounds the organisation. Static models are inadequate in eras of rapid change, says Hatch, and the learning organisation is a new metaphor for dealing with this paradox as “it suggests that organisations create their own, internal dynamics which are described as processes of organisational learning” (p.352). According to Hatch, leaders have tremendous influence within organisations, “but their ability to mobilise this influence effectively depends upon their knowledge of, and perceived alignment with, the culture” (p. 365).

If the key purpose of educational leadership is to enhance, facilitate and promote learning, then it is important to consider leadership dimensions that research has identified as making the most difference to student learning. Robinson (2007) conducted a metanalysis of twenty-six studies, a majority of which were conducted in United States schools. Using eleven of these studies, she derived five broad, abstract leadership dimensions, one of which was “ensuring an orderly and supportive environment” (p.8). This dimension did not specifically address the physical environment, but did involve “creating a safe caring and orderly school environment in which staff can teach and students can learn” (p.16), and one can assume this would in some way involve the physical resourcing of this environment. This dimension was derived from eight studies. However, there was limited quantitative evidence that explained the mechanism behind the link between this
dimension and principal leadership. Based on her metanalysis, Robinson (2008) concludes “the closer leaders are to the core business of teaching and learning, the more they are likely to make a difference to students” (p.21).

Transformational leadership

Presented with multiple models and theories, I looked for the most robust theoretical basis for my research study in its investigation of the leadership of learning communities, design and change within school contexts. I chose the transformational style of educational leadership that had emerged in the 1980s because it offered the closest alignment with the key characteristics of learning communities and pattern languages for contemporary school design. This theory was also attentive to context and culture. Leithwood, Jantzi and Steinbach (1999) argue, “outstanding leadership is exquisitely sensitive to the context in which it is exercised” and “transformational leadership is a sensible point of departure for better understanding changing leadership for changing times” (p. 4). According to Lingard and his colleagues (2003), the effective transformational leader has a firmly coded belief system and a confident worldview. This leader “is concerned with end-values: liberty, justice, equality” (p. 58). Transformational leadership typically leads by inspiring commitment and higher levels of capacity within the organisation with the purpose of greater effort and productivity, as well as more skilled practice. An outcome of this type of leadership is an “increased capacity of the organization to continuously improve” (Leithwood, Jantzi & Steinbach, 1999, p. 18). A study by Smith and Bell (2011) found principals used this type of leadership when the goals were to drive improvement, develop people and achieve change. Teacher commitment is a factor in a school’s capacity for change, and leadership is a factor in influencing both change and teacher commitment to that change. Four Canadian studies by Leithwood et. al. (1999) looked at the influence of school leadership, and in particular a transformational approach, on teachers’ commitment to change. The evidence from these studies led to a reasonable conclusion “that what those in leadership roles do may well be the single greatest influence on the sources of teachers’ commitment to change” and “transformational leadership practices have an important positive influence on those sources of commitment” (p.146).
This style of leadership can stimulate practices that are collaborative and participative and create non-hierarchical, informal structures. A model of transformational leadership with an emphasis upon collaborative approaches emerged as a conceptual framework for the leadership aspect of my study. Bass (1990) argues transformational leadership is typified by characteristics such as a focus on sharing a vision, intellectual stimulation of others, acceptance of group purposes and individualised consideration. Transformational leadership emphasises engagement, collaboration, participation through facilitating others and is improvement and community focused. A study by Leithwood and Jantzi (1990) examined the practice of administrators in twelve schools that had developed highly collaborative professional relationships over a period of change in three years. They found that the principals in their study “used six strategies to influence the culture of their schools and to foster greater collaboration. They strengthened the culture, modified bureaucratic mechanisms, engaged in staff development … communicated frequently and directly with staff, shared power and used symbols to express cultural values” (p.31). Leithwood and Jantzi (1990) conclude, “the study provides support for the claims that principals have access to strategies which are ‘transformational’ in effect and, hence, assist in the development of collaborative school cultures” (p.32). They also conclude that their study suggests “Collaborative cultures … potentially confront teachers with a different order of dissonance about purposes and practices to which they must adapt their classroom schemata” (p.33). The researchers were confident that a school culture could become more collaborative in two to three years. I reasoned if a school was to become a learning community, a leadership approach that could confront old paradigms and establish new collaborative learning environments would need to be one that demonstrated elements of transformational leadership.

In summary, with insights from the literature in the field of educational leadership, I focused my framework on the process of negotiating and creating learning cultures
and physical learning environments in schools, with a consideration of some
contemporary discussions related to leading change. I anticipated the importance the
principal would play in the process of designing and constructing the physical
learning environment, as well as the role the principal would play in articulating the
school’s learning culture and vision. The literature and my own leadership
experience in schools suggested there would be some difference between the way a
formal educational leader, such as the principal, participates and exercises leadership
in the dynamic between learning and the physical environment and the way teachers
participate and lead, and these differences would have some impact on how the
learning-buildings dynamic and the role of leadership plays are understood. In my
first case study, I became aware of the client role a principal is expected to play in
the design process. There is also an emerging perspective in my study that
transformational leadership is one way of empowering stakeholders like teachers and
students to use the potential of physical resources in their learning spaces to achieve
and maximise learning outcomes and experiences.

3.5. The theory of affordances

In the previous section, the concept of pattern languages established a framework for
analysing school design from an architectural perspective and the process of building
physical environments. However, this is not a perspective for understanding the way
teachers and students view the physical learning environments in which they work.
The theory of affordances provides a framework for explaining this student/teacher
perspective as it uses a relational perspective that focuses on the fit between people
and their environments and the perception of the affordances within that
environment. Affordance theory provides a link between the “thing” (features of the
physical environment) and the action a person perceives it affords, emphasising
aspects of an environment from the user’s point of view rather than that of the
designer. This theory has the potential to explain differences in the perceptions of
design elements amongst the case study participants. The first case study suggested
that different stakeholders, for example, school leaders and students, saw the same
spaces in different ways and in ways more significant than simple variations in personal opinions because “[t]hings look the way they do because they afford what they do” (Gibson, 1976: quoted in Gibson, 1982, p. 415). To understand how this theory is relevant to my study, I will briefly explain the key aspects of this theory and how they apply to my framework.

Over many decades since the 1950s, Gibson, an American researcher and academic working in the field of perceptual psychology, developed a framework of direct perception. He argued we perceive that all space has a surface layout, substance or composition and lighting or illumination. Affordances of things “are what they furnish, for good or ill, that is, what they afford the observer” (Gibson, 1982, p. 403). Things are not only objects but include places, events, artefacts and substances. Affordances are more than phenomenal qualities of subjective experiences, more than physical properties, they are ecological “in the sense that they are properties of the environment relative to an animal” (p. 404). Affordances “reveal the reality of meaning that is independent of language or customs” (Kytta, 2003, p. 44), and can be either positive or negative. Learning to perceive affordances is a type of perceptual learning or perceptual development. The same environmental layout will have different affordances for different people as perception of the environment. Gibson comments in particular regards to children that:

“although logically one advances from space to affordance, developmentally the progress is in the opposite direction, from affordance to space. The formless invariants in the light which the eyes of the very young pick up, instead of the forms of the visual field, are just those that specify affordances …” (Gibson, 1982, p. 407).

Affordances point both ways, and therefore, what the thing is and what it means are not separate, with “the former being physical and the latter mental” (p. 408). Gibson also reasoned mobility revealed significant information about the environment, and therefore, visual perception was crucial to experiencing the environment. Acting is part of the means by which other affordances are revealed. For example, a student needs to work on a task with a small group of other children. That student literally
sees a table that is larger than her/his own personal desk, s/he goes over to it and then sees six chairs can be gathered around its four sides but also sees it is close to other groups of students. The proximity of the other group may affect the work of this student’s group, so they look for moveable elements in the room that could solve that problem and so on. This theory emphasizes that the knowledge the student has of a learning environment is derived from action that occurs as a result of literally seeing what potential the material environment has to offer. The affordance is situated between the individual and the environment but is not a specific characteristic or element of either. It is what could potentially happen, if the individual and environment interact. Affordances exist regardless of whether or not the individual perceives them.

Gibson’s theory also acknowledges that an individual’s physical attributes, such as body proportions, are crucial to perception and the possibility of actualizing a perceived affordance. Children’s ability to perceive affordances develops with age and improves as they develop more refined physical skills. Kytta (2003) argues the perception of affordances is also taught to children by parents in terms of increasing awareness of affordances and how to actualize or restrict the actualization of those affordances. Therefore, if instruction is important to developing perception of affordances in children, I suggest teachers are crucial to teaching students how to perceive and actualize affordances within the classroom and school environments.

Another academic working in the field of environmental psychology, especially as it has been recently applied to children’s environments, is Heft. Heft (1989) argues there are potential and actualized affordances. The affordances of a given place in the environment establish for an individual what actions are possible in that context in relation to that individual. Potential affordances exist because the environment supports them. For example, the affordance of a sitting on surface is a potential in an environment that offers surfaces at a low height that are flat enough and strong enough to carry the weight of people. An actualized affordance is a potential affordance that has been acted upon. Using the same example, a child sees a low, stone retaining wall, perceives its physical qualities will provide a sittable surface
and sits upon it. However, regardless of whether or not the child sits down, the wall still provides the sittable surface. Heft (1989) also emphasizes an object offers multiple affordances in relation to the perceiver’s potential for action. It is context that gives higher-order environmental information that directs the choice of which potential affordance is appropriate for actualizing. Heft suggested the causal character of the relationship between affordances of the environment and the perceiver is that of “fittedness and compatibility” (Heft, 1989, p. 10). Affordances do not cause behaviour but can prompt and constrain the actions that can be expressed in a setting.

The concepts of pattern languages and affordances can work together and provide a depth of understanding of how the physical learning environment is perceived and used by all the different participants. Alexander’s concept of patterns describes the construction of the physical space and the theory of affordances explains how students and teachers see and use the spaces after construction. Both describe a person-environment system and are relational concepts. The pattern language articulates what is present in the human-environment relationship as a result of design and affordances are situated between the individual and the environment without being a characteristic of either of them alone.

**Conclusion**

In conclusion, four theoretical constructs provided me with a conceptual framework for investigating the relationship between students, teachers, learning and the physical environment in schools. Due to the scope and complexity of the area I was investigating, I felt it appropriate to use a number of concepts and develop a robust theoretical framework by integrating the theoretical links between architecture, learning communities, pattern languages, affordances and leadership in the context of schools. Figure 2 draws together the different theoretical constructs into one framework. These constructs have a number characteristics in common, these being: engagement; participatory; individualised support; collaborative; facilitating learning in others; community focused; and improvement focused. It is through the lens of these common characteristics that I investigated the relationship between the learning
environment and the learning culture of a school.

![Diagram showing common characteristics linking four theoretical constructs.]

**Figure 2:** Common characteristics linking four theoretical constructs.

In the following chapter, I will explain how I used this framework to conduct my research and the methodology.
Chapter Four: Methodology

The purpose of this chapter is to explain the methodology of my research project, the ethical protocols observed and provide justification for the choice of case study, qualitative data collection procedures and interpretative analysis. This chapter is organised around the following sections: an overview of the case study methodology; my role as researcher; selecting the cases and participants; data collection using qualitative research approaches; and my use of interpretative data analysis.

As discussed in previous chapters, the purpose of the study was to investigate the relationship between school design, the learning environment and learning communities in new schools. The study’s key research questions were:

1. What are the intended outcomes of school design from the perspective of stakeholders and in relation to the specific school contexts? (Stakeholders are educational leaders in the school, teaching staff, students and architects.)

2. What are the key influences on the design of school architecture and use of educational facilities?

3. What is the relationship between architectural and design factors and the development of an effective learning environment?

4. How does the leadership in schools influence the design of physical learning environments?

Overview of case study methodology

My research project was an unfolding study of the experiences and perspectives of staff and students in three schools. The case study methodology I used was a “linear but iterative process” (Yin, 2009, p.2), whereby the project design drives the preparation for the study and collection of data. Data collection fed refinements back to the design and preparation activities, as well as leading forward to analysis and the
sharing of findings. Analysis also fed directly back to the original design reigniting the research process with the same or another case study. The case study research process is a series of interconnected cycles, looping back and forward to various points in the process. These cycles are “constantly augmented by new information and the process of understanding is fuelled by this continuous stream of information” (Kinsella, 2006, p.3).

Yin (2009) suggests a case study approach is preferable when “examining contemporary events [but] when the relevant behaviors cannot be manipulated” (p. 11). A case study methodology was judged as appropriate because my research project was primarily an investigation into a relationship between people and their daily work surroundings and the focus was upon contemporary phenomena. The project was focused on what could be learnt rather than proven about the relationship between the learning environment, behaviour and learning culture. A case study approach also allowed for a focus on the context of each school and retention of “the holistic and meaningful characteristics of real-life events” (Yin, 2009, p.4). Since the educational facility design literature defined the relationship between school design and learning as being complex, a case study approach was judged to be suitable for a close analysis of “real-life situations and its multiple wealth of details” in order to develop a “nuanced view of reality” (Flyvbjerg, 2004, p.422). The case study approach provided the opportunity to test views directly in relation to phenomena as they unfolded in practice (Flyvbjerg, 2001) and to gain better understanding of the whole by focusing on a key part (Gerring, 2007). Another strength of the case study is the telling of a story “in its diversity, allowing the story to unfold from the many-sided, complex and sometimes conflicting stories” (Flyvbjerg, 2004, p.430), and due to the complexity of schools and the multiple stakeholders involved, I anticipated the need to allow for multi-sided stories.

My research project comprised a case study dataset of three cases, the first of which was also treated as a pilot study. The reasons for doing a pilot study were: to refine my data collection plans in relation to both content of the data and procedures to be followed (Yin, 2009 & 2003 ); to enable me to develop additional questions or test
the relevance of my current questions; and to provide some conceptual clarification as the project spanned the diverse fields of leadership, educational facilities design, pattern languages and affordances. I anticipated the first study would inform and refine the collection approach for the two other cases. My design included multiple cases within the study for a number of reasons. As part of the iterative process, I deemed that each case would strengthen the design of the investigation and deepen my understanding of the complex relationship under research. None of the cases can be seen as critical cases, but like Flyvbjerg, I would argue that a strategic choice of cases may enhance the generalisability of the study (Flyvbjerg, 2001). Therefore, case selection was purposeful. The three schools were maximum variation cases in that the schools were different for each other in at least one of the following dimensions: location; non-government\(^4\) system; size or budget (Flyvbjerg, 2004). Triangulation of data and using multiple cases and informants also strengthened the transferability of findings (Gerring, 2007) as commonalities across the accounts led to useful insights that have wider implications. The multiple cases allowed me to draw an additional single set of cross-case conclusions. Since case studies emphasise the views of the participants of a particular social reality, I felt this was an important counterpoint or alternative perspective to the research that emphasised analysis of student levels of achievement and post-occupancy satisfaction surveys that were the current basis for many studies in the school design field (for example, Earthman & Fisher, 2002; Lackney, 1996; PricewaterhouseCoopers, 2010). I chose a qualitative research approach to enable me to capture the values, attitudes and preferences of participants from three different but similar contexts with the aim of permeating the “how” and “why” underlying the believed impact of architecture on the learning culture of a school.

Qualitative data was analysed using an interpretive approach. This overarching interpretative approach emphasised the “constructed nature of social meaning and reality” with an aim to “understand how people construct and act upon meaning ... 

\(^4\) In New South Wales, there are two sectors: government (public schools) and non-government (independent schools). The non-government sector includes all schools that are not public schools (note: public schools are the responsibility of the state government and administered through the NSW Department of Education and Training).
Thus reality is not a prior given” (deMarrais & LeCompte, 1999, p. 39). The interpretative perspective in this study was less about predicting or generalising behaviour and more about understanding, interpreting meaning and intention. The aim was to explore the underlying relationship between the “how” and the “why” behind the “what” and illuminate meaning from within (Dodge et. al., 2005, p291). I was concerned with interpretation, the situated location of that interpretation and the analysis of meaning of a text (Mertens, 2005). The interpretative approach goes beyond telling a story of the experiences of specific groups of people, and it allows research to progress beyond description of rich findings to generation of understanding. For example, the connection between school design, the learning environment and learning communities is based primarily upon the dynamics of human to human and human to environment relationships, such as the one that exists between the learner and teacher or the teacher and their workplace. Each relationship or connection may rely on specific perspectives influenced by the role educational facilities and the physical environment fulfils or the impact it may have on the people in the relationship, as they go about their daily work.

4.1. My role as researcher

I used my teaching experience and my knowledge of contemporary educational facility design literature as general resources in my role as researcher. I have been a teacher in the independent sector for over twenty years, and am familiar with the process of establishing Kindergarten to Year 12 schools from scratch, as well as building educational facilities in stages and according to school-based design briefs. As a classroom teacher, I have experienced the process of modifying and adapting physical learning environments in an endeavour to deliver my teaching programmes, accommodate current pedagogy and achieve student learning outcomes. In my previous school, I have held the position of deputy principal in a large metropolitan school, so was experienced in senior leadership roles. I have recently completed my Master of Education in educational leadership, so my knowledge of leadership theories, pedagogy, building school capacities and learning cultures is detailed and current. These professional experiences and post-graduate study have prepared me
for my role as observer and researcher in the area of school culture, pedagogy and leadership. I am also well equipped to research within schools, as I understand the nature of schools as organisations and the type of work involved in educating young people in contemporary society. The participants knew I was currently working in a school whilst completing my doctorate. They saw me as someone who understood their work from more than a theoretical point of view, and this opened up a valuable level of dialogue.

A non-participant observer role was also maintained by keeping a focus on interpreting what was occurring rather than validating predictive theory. I was not seeking to prove or test whether or not the case school was a learning community or evaluate the style of architecture against the current trends in design. I was vigilant in ensuring my views of current design did not enter into the interpretation of the participants’ accounts, nor did I try to find evidence for personal views I may have formed from my own experiences as a teacher and leader other than agreeing with the commonly held belief that school design matters and it has an impact on learning. As researcher, I remained focused on understanding how this might be so in the case study schools and how people within these schools view the impact of school design on learning. I had to be attentive to the meanings the case participants created, regardless of my views and experiences, and to be cautious of shaping participants’ responses. However, I was able to make a clear distinction between meanings rooted in participants’ words and my own impressions of the case study environment by keeping the contextual narrative of what I had observed separate from the participants’ meanings. Participants could also share their views on my perspectives through their responses to my selection of photographs of the built environment. They could select photographs that represented their responses or describe other places that did not appear in the displayed images or drew images or were invited to take their own photographs.

A fundamental principle of my practice as a researcher was to recognize I was participating in a process that was transactional and reflexive. Participants reflected on the association between the research questions and their responses, whilst as
researcher, I reflected on the association between the data and what I understood about the relationship between school design and learning. As I collected, organized and analysed data, my experience and professional skills assisted me in the process. I recognized the impossibility of claiming to be objective. Instead my role was one of “intersubjectivity” (Radnor, 2001), whereby meaning was interpreted through interaction between myself and the case. Through a reflexive cycle, the participants “explained” themselves to me, thereby giving meaning to what I had observed in that situation. However, I also recognized that I was constantly involved in decision-making and cycles of making sense of things. It was not possible to disregard my way of seeing, however, by engaging reflexively in the process, I was able to identify my own effect on the process and on the participants and my own subjectively in relation to the impact of design on learning. Through constant consideration of the literature, reflection on my own views and working directly with the participants’ own words, I was able to arrive at a critical distance from the data.

The research relied upon the key criterion of trust. As a researcher I conducted the project with integrity, the data collection process ensured the data was trustworthy and participants were treated with respect. Participants supplied informed consent and interviewees were able to verify their responses by checking their transcripts. For each case study, I applied for approval to conduct research involving human participants. As part of the application, three main ethical issues were identified in relation to my study: confidentiality, anonymity and informed consent from students under 18 years of age. These issues were addressed in a number of ways. Many of the documents and records were readily available within the school’s community, for example, school timetables, architectural blueprints and design notes. Signed permission to use school-related material, regardless of whether or not it is deemed confidential or sensitive, was sought from the school administrators, consulting architects or principal at the commencement of the case study. Participants were de-identified in the transcripts of interview, participant-generated-photography/images and field observations. The “Great Places for Learning” activity was anonymous. Sensitive information was not collected.
Participation in all aspects of the research was voluntary and informed. Student participation involved both specific informed consent forms for interviews and negative consent (that is, students could choose to withdraw from participation) for the questionnaire. Students joined the research project under the supervision of staff at the school and according to the school’s policies. Questions focused only on the students’ built environment. All participation was informed, voluntary and negotiated, with a total time commitment ranging from 20 minutes per student to less than 50 minutes (for those who choose to be involved in the additional participant-generated-photography/images activity) spread over two months. The principals were approached by letter, with follow-up telephone conversations to establish interest in the project, access to the school and contact details of the architects. Staff were given a verbal description of the project by the Principal or their delegates. Students were approached through senior teachers or leaders. The following documents were prepared for each case: Information sheet for staff; Information sheet for students, Information sheet for students’ parent/guardian; Information sheet for school leadership; consent forms for school, adults and students. Transcripts of interviews were confidential, and only the participant received a copy and were invited to make modifications or additions.

There were also a number of strategies for minimising identification of case study schools. Photographs focused on specific architectural or environmental aspects of the overall design (for example, details or examples of pattern languages) rather than comprehensive images that a visitor to the school would readily recognise. Most of the architectural details recorded in the photographs would be difficult to locate out of context. Photographic images did not show the name of the school or identifiable personnel or college crest or motto. Where possible, photographs that suggested the school’s location were avoided, unless crucial to exploring the relationship between the built environment and the learning culture.

Whilst my role as non-participant researcher was maintained for all cases, my association with the first school was different from the other two cases. The first study was conducted at Jacaranda College. I was teaching at the school at the time of
the study, and I had some insider knowledge of the organization. To some extent I shared similar experiences with the staff. However, my daily work that included a middle-level executive role did not involve me in the design and construction of educational facilities. I was not involved in strategic planning for the school. I made it clear to all participants that the research was not part of my employee role and data collected was to be used for the purpose of the research project as outlined in the information and consent forms that were supplied to participants and the principal.

My role as a non-participant observer was more straightforward with the other two case study schools. I had no prior association with Acacia and Grevillea Colleges and all three case schools were from different geographical areas of New South Wales and from different independent systems (see Section 3 for an explanation of NSW independent systems). I was introduced to all participants as an educational leader and teacher working at Jacaranda College and was currently completing a doctoral research project that investigated the impact of school design in their college. Participants did not give any indication that they believed I had a conflict of interest or that I was not able to maintain my non-participant observer role. The data collected indicated participants saw me as an “outsider” to their college, who had some generic “insider” knowledge of their work contexts and the core business of teaching and learning. The principals of the colleges gave no indication that my professional role in another school created difficulty in terms of confidentiality or deliberate bias in the data. The principals were generous with data, documents and access to the colleges. I believe this level of trust was due to the fact these principals had already considered these issues before consenting to the colleges’ participation.

Over the years, I had visited many schools and was familiar with myriad solutions to the problems, challenges and requirements created by the provision of educational facilities. Prior to conducting the pilot study, I visited a Melbourne firm of architects specialising in contemporary school design. The partners of this firm spent a number of days talking to me about the design process, showing me their projects and taking me on visits to exemplar schools. I subsequently attended a Council of Educational Facility Planners International Conference (Melbourne, May 2008), which involved
lectures, workshops presented by leading Australian and international practitioners in their fields and field visits to new schools with the designing architects. I also met with an Educational Facilities Planning Consultant, who used a facilities evaluation tool based upon a new pattern language for school design. She explained how the tool worked and showed examples of her work with school clients. These experiences and my extensive reading in the area of contemporary educational facility design and evaluation tools, strengthened my preparation for my role as observer and researcher in this area.

4.2. Selecting the cases and participants

In my study, each school was a registered and accredited Kindergarten to Year 12 co-educational day school in New South Wales. The schools were all from the non-government (independent) sector. Each school was independent of the others and did not share the same governing body or belong to the same system. Whilst cases are not always perfect representations of an entire population, key features of schools are represented in my selection. A case study of an organisation called a school rests on the micro-macro link. As Gerring (2007) suggests, sometimes in-depth knowledge of an individual example is more helpful than fleeting knowledge about a larger number of examples and we gain “better understanding of the whole by focusing on a key part” (p.1). Moreover, between the three schools in the study, there were significant points of comparison and similarity, despite being governed by three different non-government sector organisations.

Every school has its unique context, which defines its culture, influences its organisational structures and affirms or challenges its leadership practice (Dinham, 2008). Since I was using different schools as multiple cases, I collected information concerning the school-based contexts of each case, as well as their physical setting.

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5 In New South Wales schools belong to either the government or non-government sectors. All government schools are governed by the NSW Department of Education and Communities. Non-government schools belong to independent systems like the Catholic Education Office, which exercises some control over their schools, or organisations of member schools, such as the Association of Independent Schools. Non-government schools exercise varying degrees of autonomy and independence.
and historical context, remembering schools are “locally assembled phenomena” (Silverman, 2007, p. 30). It was important to place the participants in context, and specifically, in relation to the process of establishing a new school. My aim was to preserve the texture, features and details of the individual cases that can be lost in large cross-case analyses (Gerring, 2007). Throughout the research, I attempted to account for changes in the overall design of data collection approaches as a result of increasing understanding of the setting of each school.

The overall population from which I could draw my sample given my own location and work commitments were a sample of three schools drawn from New South Wales schools that fitted the criteria and agreed to be involved in the study. The criteria for selection each case were as follows:

1. The school was new, which meant it had been established or “relaunched” during the past 10 years. The current school should reflect principles and a vision that are consistent with those expressed when the school was founded (these are usually found in the school prospectus, enrolment information, promotional materials and on the website), and the teaching programmes should be responsive to current pedagogy and curricula. The age of the school was to coincide with the emergence of learning community pedagogy.

2. The school leadership team was directly responsible or substantially involved in the design and construction of the new school. Therefore, data concerning concept and building briefs should be more readily accessible from those most directly involved.

3. Leadership articulated a vision for a school culture that resonated with characteristics typically associated with a learning community or innovative learning cultures. This vision was stated in school documents and

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6 This could be due to another school acquiring the site through a merger or the school changing to a different system and a new school is effectively established. Relaunch can also occur if an existing school expands into another aspect of schooling, for example, a K-6 school expands into secondary education.
communications easily accessible by the public, such as the school’s website, public letters from the principal, newsletters or school prospectus. Therefore, it could be assumed the school identified itself with a learning community culture.

When selecting the schools for this study, I found the New South Wales independent (non-government) sector provided the greatest number of cases that fitted this criteria, and the selection of three Kindergarten to Year 12 schools within this sector provided an opportunity of some additional cross-comparison analysis between like schools. I approached four schools and three agreed to be involved. The first study informed and affirmed the data collection strategies that were used in the other two cases.

After initial contact with the principal, I was put in contact with other executives, who facilitated my visits and approached teachers and students, who would in turn participate in specific questionnaires and/or interviews that focused on a particular area of the school. Therefore, a purposive sample of participants was recruited from the case schools. Contact by letter and email was also made with the consulting architectural firm. It so happened that the same firm was currently associated with all three case schools. One of the senior partners was interviewed during the pilot study stage and then towards the end of the project.

The first case was a K-12 independent school in the process of expanding and commissioning a ten year master building plan. Access to the school for the purpose of conducting this pilot study had been approved by the principal. In addition to fulfilling the selection criteria, Jacaranda College was chosen for a number of reasons. I had a fair understanding of the case context and a working knowledge of the learning culture. If a data collection approach did not work successfully, or not as I had anticipated, with people with whom I already had a relationship, I knew I would need to reconsider its design when using it in a school where I was an outsider with more limited access. The college was undertaking a large building project, so I was able to focus the study on this new educational facility as it was nearing
completion. By including a specific building project I was able to broaden the scope for inquiry, thereby trialing the full range of data collection approaches. I also used the time working with Jacaranda College refining my understanding of pattern languages as a way of defining space and design.

The second study, Grevillea College, had been established in 1998. It was a K-12 school. The school culture still reflected the foundational principles and vision. The school leadership team was directly involved in the design and construction of the new school. Leadership claimed an educational vision that resonated with definitions of a learning community and innovative learning cultures. This vision was articulated in the college website, enrolment information and Middle School curriculum materials. After initial contact with the principal, I was put in contact with the Head of Middle School, who then approached teachers and students. Data collection commenced at the senior leadership level, with the principal, Head of Middle School and bursar. These participants were the personnel who had the formal authority to initiate and contribute directly to the design of the college’s educational facilities. They were also able to supply me with documents describing the college, its curriculum and a master plan for the site. Grevillea College was organized into three schools; Junior, Middle and Senior (this structure is explained in detail in Chapter 6). I asked if I could work more closely with one of the schools rather than all three. In particular, I was looking for a section of Grevillea College that had a degree of flexibility with determining learning experiences for students and opportunities to implement new programmes that were responsive to current pedagogy, as well as students who would be able to work with the levels of literacy (both visual and written) required by the some of the research activities. The Senior School’s curriculum was substantially determined by the rigid requirements of the New South Wales leaving certificates\(^7\) and the Junior School students would struggle with the literacy demands of the activities. The Middle School was ideal for all aspects of the study. It was also a distinct community within the college with strong leadership and

\(^7\) NSW School Certificate for Year 10 and the NSW Higher School Certificate for Year 12.
a recently adopted curriculum, the smarTrack system\(^8\), that was designed to suit the needs of the Middle School learner.

The third case was Acacia College. It had been established in 2000, and the school culture still reflected the foundational principles and vision. It was a K-12 school. The school leadership team was directly involved in the design and construction of the new school. Leadership claimed an educational vision that resonated with definitions of a learning community and innovative learning cultures. This vision was articulated in the college website, enrolment information and a Middle School curriculum that had been recently implemented in Year 6. After initial contact with the principal, I was put in contact with the College Manager, Head of Junior School\(^9\), the Principal’s Professional Assistant and the Stage 3 Co-ordinator. I made contact with a number of Year 6 teachers, who facilitated my classroom observations and visits. For the same reasons as the Grevillea case study, I focused on the Year 6 cohort and the use and provision of physical environments to support the cohort’s pedagogy and curriculum. A preliminary site visit was conducted in the early stages of setting up this study. I met and corresponded with the principal and college manager and collected college documents and architectural plans, in advance of the main series of site visits. A decision to focus on Year 6 was made when organizing the data collection visits. During this time I also conducted an interview with the architectural firm responsible for all three cases.

### 4.3. Data Collection

My study used six constructed data collection activities in three cases, each was a within-case variation at a single point of time. The qualitative data collection processes I used were designed to “explore contextual webs of meaning” (Harvey & Myers, 1995, p.17). In the first study school (Jacaranda College), I made two sets of observations, one whole school and one focusing on a specific building project. With

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\(^8\) This system is explained in detail in Chapter 5.

\(^9\) At Acacia College, Junior School referred to the Kindergarten to Year 6 section of the college. The structure is described in greater detail in Chapter 7.
Grevillea College, I made two sets of observations, one whole school and one of Years 5 and 6 in the Middle School. For Acacia College, I also made two sets of observations, one whole school and one of the Year 6. Thereby totalling six sets of observations in three cases. Data collection began at the senior leadership level, with the principal, heads of school or deputies, bursar or manager. These participants were the staff who had the positional authority to initiate and contribute directly to the design of the college’s educational facilities. In all the cases, I felt prolonged engagement with each school was important (Lincoln & Guba, 1985), if I was going to understand the participants within their environment. Of course, prolonged engagement would mean something different with each case but I did maintain contact with each school for at least a year (for example, visiting the school website regularly, meeting staff at conferences, participating in a series of site visits). A schedule of the data collection visits and activities is shown in the appendices (see Appendix 19), as is a table of the number of participants involved in the activities (see Appendix 20).

I used a number of different perspectives or lenses to observe the colleges, and in particular the sections of the colleges with which I worked closely. These lenses were the educational leaders, the teachers, the students and the researcher. Schools are complex places to experience and understand within a short period of time. Since the purpose of my study was to investigate the relationship between the physical learning environment, leadership and learning communities, it was necessary to see the college from a variety of perspectives that could provide impressions of this relationship in all its complexity. As the researcher, I walked through the learning spaces, talked informally with staff and students about their spaces for work and learning, listened to staff members through formal interviews and recorded visual aspects of the built environment with photographs, read what students had to say about great places for learning and read what the college explained about itself through official documents, website and its prospectus. I drew sketch maps and site diagrams of the schools, which appear in Chapters 5, 6 and 7. I looked for physical places, texts or observations that would build knowledge of the relationship between the physical spaces, pedagogy and the people who work and learn within these
My data collection approach was piloted in the first school, Jacaranda College. I collected data in the light of my key research questions and I evaluated the effectiveness of my methodology before moving onto the two main case study schools. Observations focused on the following: the planning that was taking place in preparation for a major building programme; the ways in which leadership, management and the architects collected information about the educational goals and vision for the campus; the type of information these stakeholders collected and used in the process; and how this information was manifest in the building plans. These findings were compared to the educational vision of the school.

Initially, seven key questions informed my first study and, except for the second question, each of these questions was investigated using at least two sources of data. These questions were later refined and reduced to five (see Table 3). I initially designed five data collection activities (document reviews, interviews, observations, participant-generated photographs, researcher-generated photographs).

<table>
<thead>
<tr>
<th>Key Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are the intended outcomes of school design from the perspective of stakeholders and in relation to the specific school contexts?</td>
</tr>
<tr>
<td>2. What are the key influences on the design of school architecture and use of educational facilities?</td>
</tr>
<tr>
<td>3. What is the relationship between architectural and design factors and the development of an effective learning environment?</td>
</tr>
<tr>
<td>a. Do architectural and design factors influence the development of an effective physical learning environment?</td>
</tr>
<tr>
<td>b. Which architectural factors influence the development of a learning community?</td>
</tr>
<tr>
<td>c. How do staff and students use space and make attachment to place, and what do certain spaces mean to them in terms of being a part of a learning community?</td>
</tr>
<tr>
<td>4. How does the leadership in the schools influence the design of physical learning environments?</td>
</tr>
</tbody>
</table>
The data collection approaches and the development of the various collection activities are explained in the following sections. These approaches are summarised and mapped against the research questions in Table 4 (see Appendices 21 - 30 for copies of the research activities). All the case studies began with collecting documents (such as Google Earth maps, architectural plans, statements of founding vision and goals, daily organisational schedules such as timetables) that provided context and background information. These documents were collected before and during the first research visit. The advantage of a review of documents is that it is an unobtrusive non-reactive method (Marshall & Rossman, 1995) and the data has not been generated with the researcher in mind.

<table>
<thead>
<tr>
<th>Key Questions</th>
<th>Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1. Document/record reviews - Collected and analysed site maps, architectural plans, briefing notes, statements of founding vision and goals for the new school, school timetable and rooming allocations. These documents provided context and background information. Sourced from the school and architects. Conducted before and during first visit to school.</td>
</tr>
<tr>
<td>2.</td>
<td>2. Interviews with Principal and Architects or Buildings/Business Manager - Unstructured. Clarified document/record information. Established the educational and design vision for school.</td>
</tr>
<tr>
<td>3.</td>
<td>3. Survey - focused on both foundational vision and current school practice. Developed for this research but could become a collection method for other studies. Used pattern language as basis of survey questions. Cross sectional design. Purposeful sampling of staff and students within the school. Fewer than 100 per school.</td>
</tr>
<tr>
<td>4.</td>
<td>4. Observations - field notes, photographic and diagrammatic representation of the physical environment, annotated observations during site visits (4 days per case school distributed over 2 or 3 visits). Non-participant role for researcher. Cluster sampling of sections of the physical environment within the chosen schools. Focused on staff and students working in public and communal spaces, as well as small spaces. Observed the larger school community using selected spaces and explored trends that emerged in survey and document review. Photographic observations are without people or with de-identified people, if necessary for the purpose of the image.</td>
</tr>
</tbody>
</table>
The option of using these activities was maintained for the other two studies.

| 2. | Participant generated photos and annotated notes/maps - visuals of the visible in the environment. A class (eg. Visual Arts) and volunteer teacher(s) collected 2 images around key questions. Written support statement. Completed before final visit. |
| 3. | 5b. Interviews using participant generated photos - semi-structured, 20 minutes (students could be interviewed in pairs). Four to six interviews. Anticipated some snowball or chain sampling to occur when seeking intensity or information rich cases. |

Table 4: Data Collection

Executive Interviews

I then used an “elite” interviewing approach (Marshall and Rossman, 1995), whereby participants selected for this type of activity were considered influential, prominent and well-informed within the organisation or community. These participants can give valuable information known to a limited number of people, as well as having an overall view of organization. They can give a comprehensive contextual view of the organisation and current projects. The disadvantages of using this approach are a lack of knowledge of the micro levels of organisation and operational realities of daily work practice, participants can be too visionary or can provide too much of the “official line” and public face. To address the potential disadvantages of this type of interviewing approach, I involved staff and students in other research activities, triangulated data and conducted the interviews with senior leadership and teachers in a semi-structured format. The purpose of the leadership interviews was to clarify information gleaned from the documents surveyed, establish the educational vision of the school and explore the role leadership played in the construction of educational facilities. The consulting architect was also interviewed. The interviews were audio recorded or conducted by email and transcripts returned to the participants for review. Ethnographers have found that interviewees often “discover what they meant after they have spoken” (Silverman, 2007, p.7). Therefore, participants were invited to add, change or subtract anything they wished from their interview transcript. No participant chose to exercise this option in any of the cases.

Observations and photography

The next stage of data collection involved researcher observations and a
photographic survey conducted by me in a non-participant role. These unobtrusive
approaches facilitated access to a broad sample of learning spaces and collection of
behavioural data relating to use of the spaces. Since I knew I would have greater
access to the pilot study’s site than in subsequent cases, I focused on refining my
knowledge of educational facilities design tools and pattern languages as they
appeared in physical examples of design and facilities. I took field notes and cluster
samplings of sections of the physical environment. I recorded photographic images
and notes on the independent learning and communal spaces, and worked from
sketch drawings and plans for the new building project. Towards the end of the study
I was able to conduct detailed photographic survey of the building project. The
images did not include people.

As explained in the previous chapter, I devised a table that described the
characteristics of a physical learning environment that one might expect to find in a
school that emphasized a learning community culture. This table took into account
current design features, characteristics of learning communities and current patterns
in the language of school design (reproduced here as Table 5). This table became a
guide for my observations, field visits and photographic surveys. It also summarised
the language of space as found in the current literature on school design, thus
ensuring I could locate examples of these characteristics and patterns, if they were
evident in the next two case study schools.

<table>
<thead>
<tr>
<th>Key Patterns</th>
<th>Associated Design Principles</th>
<th>Examples of architectural/design features and indicators of pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalised</td>
<td>Site &amp; building organization</td>
<td>• Human scale</td>
</tr>
<tr>
<td></td>
<td>Character of all spaces</td>
<td>• Way-finding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Distributed resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Welcoming entry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Home base &amp; individual storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Accessible to all abilities and mobilities</td>
</tr>
<tr>
<td>Key Patterns</td>
<td>Associated Design Principles</td>
<td>Examples of architectural/design features and indicators of pattern</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Learning-focused</td>
<td>Site &amp; building organization</td>
<td>• Signature (organisation’s identity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Transparency (connections visible)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Varied spaces – resource rich</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Studios and specialist labs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Presentation areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Integrated technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Indoor/outdoor connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cave space</td>
</tr>
<tr>
<td></td>
<td>Site design &amp; outdoor learning spaces</td>
<td>• Wide range of experiences</td>
</tr>
<tr>
<td>Collaborative</td>
<td>Site &amp; building organization</td>
<td>• Clusters of learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Gathering spaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Casual eating areas</td>
</tr>
<tr>
<td>Community connection</td>
<td>Planning &amp; design process</td>
<td>• Sitting in context</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Well located</td>
</tr>
<tr>
<td>Adaptable and Flexible</td>
<td>Site &amp; building organization</td>
<td>• Multi-use classrooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Learning support - furniture and storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flexible boundaries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adaptable utilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Living buildings</td>
</tr>
<tr>
<td>Neighbourhoods</td>
<td>Site &amp; building organization</td>
<td>• central open space used in common by the classrooms surrounding this space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• rooms installed with a range of operable walls learning spaces can be expanded and linked in a range of combinations</td>
</tr>
<tr>
<td>Villages</td>
<td>Site &amp; building organization</td>
<td>• a number of neighbourhoods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• arranged around a larger common area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• circulation spine/zone</td>
</tr>
<tr>
<td>Studio Communities</td>
<td>Site &amp; building organization</td>
<td>• clusters of flexible teaching spaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• contain a range of learning modes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• arranged around a communal space for larger social and learning activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• direct access to outside &amp; common areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• self-contained elements</td>
</tr>
</tbody>
</table>

Table 5: Criteria for analyzing design of school environment.  
[Table based on Bergsagel et. al. (2007), Nair & Fielding (2005) and Lackney (2003)]

Participant responses to the environment

The final stage of the first study involved student and staff participants. Staff and
students were invited to give written and provide their own visual responses to open questions such as “Where do you like to work on group projects?”. The participant-generated photography approach has been used in other research projects that seek insight into people’s ways of seeing their worlds and affective responses to physical situations (Stedman et. al., 2004; Raggl & Schratz, 2004; Felstead et. al., 2004). In the first study, participants were given two questions and invited to write about their selections, take photographs of the spaces, give their images captions or annotations and locate the spaces on a site map. I then selected a small sample of staff and students for an interview based upon their availability, willingness to be interviewed and the type of responses they gave. The participants had written quite definitely about some aspect of the impact or effect of physical spaces on their work and learning and an interview might develop an information rich response. Since I wanted the interviews to follow the participants’ train of thought and personal response to their choices, I used the semi-structured approach using their written and photographic responses as a focus of the interview. Interviews “allow the researcher to understand the meanings people hold for their everyday activities” (Silverman, 2007, p.81). Difficulties with interviews can relate to gaining co-operation to be involved, shyness to reveal candid views on sensitive situations/issues, for example, teachers’ comments on their workplace or conditions, and the sheer volume of data.

An absence of a shared language between the participant and researcher can also pose difficulty, something I discovered in this last stage of research when my way of talking about the built environment and architectural details was in contrast with teachers’ ways of describing their classrooms (Earthman, 2009) Therefore, it was valuable to triangulate interview data with data gathered through other approaches. The interviews were audio recorded and transcripts returned to the participants for review. They were invited to add, change or withdraw anything from their interview transcript. My interviews with students were done in a group setting. I decided upon this approach after staff participants had struggled at times to find a language to explain their responses to the architecture around them and whilst the photographs helped but also made it difficult for them to translate their meaning into words. Since the staff found this process difficult and after reviewing the student written responses
that tended to be brief and void of architectural terms, I decided to interview the students as a group, hoping a conversational tone would assist the flow of ideas. This was very effective. The students heard similar questions repeated and gained an idea of how to approach the question by listening to others’ responses. Since the students had already made their choices of spaces and had written some comments, they did not copy one another’s responses as each student’s comments were not relevant to the other students’ choices.

**Questionnaire**

I had originally intended a sixth data collection activity that would focus on teacher and student responses to the built environment. It was a questionnaire activity that would have involved closed and open-ended questions, drawing upon a large sample of participants from across the school. Usually the strength of a questionnaire lies in its ability to manage a large sample responding to specific research questions (Klein, 2005; Dinham et. al., 1995, Ellison, 2006, Pomson, 2005). The difficulty would lie in the interpretation of the data in the context of a qualitative study and the honesty of responses that could not be probed or cross-checked through conversation. I did not use this activity in the Jacaranda study for a number of reasons, the main one being the building project at the school had run overtime. This had an immediate impact on the timing of the research project and delayed access to the building that was the focus of the study. The questionnaire was going to focus on post-occupancy responses to the new building but occupation was delayed by many months.

Despite being unable to pilot a questionnaire, I decided it would still be a valuable approach to consider with the remaining two studies. While I waited for the building to be completed, I conducted the other research activities and discovered the difficulties experienced by the participants when articulating their responses to architecture, physical spaces, feelings of attachment to their workplaces and so on.

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10 Closed questions require direct responses and do not invite respondents to elaborate or express diverse opinions or reflections. Responses to closed questions usually requires specific information from the participant.
The struggle to find a comfortable, common language for dialoguing about these aspects was going to have an impact upon my data collection activities. This was an important outcome of the first study.

I developed the questionnaire activity for the second and third case studies. I had been reflecting on the challenges of developing an effective and reliable questionnaire for a qualitative approach when I became involved in a Child Friendly by Design project that was a collaboration between local community organisations and researchers from Griffith University. My activity was inspired by a particular technique used in this project (Project for Public Spaces, 2003; Healthy Cities Illawarra, 2010). My “Great Places for Learning” activity involved students and their teachers from a specific section of the school completing activities that focused on their use and views of the school’s educational facilities. Responses were anonymous and completed in an interactive setting. I selected a range of photographs that related to the parts of the school used by the sample of students. These photographs came from my whole school survey, so I knew they represented key features of design and learning environments. The photographs were labelled with letters of the alphabet and displayed on large boards within the school. Students and staff were given questionnaires printed on paper, invited to view the photographs and respond to questions like “What part of your usual classrooms do you like to use the most?” and “If you had to work by yourself anywhere you like in the college, where would you choose to work by yourself? Is it shown in any of the photographs? If no, is there a photo that looks most like the place you have chosen?”. The use of photographs as prompts was aimed at overcoming the difficulty of finding a common vocabulary for all the architectural terms and details involved in the study. The photographs assisted the participants with interpreting the educational facilities design focus of the questions without the researcher becoming individually involved in one-on-one conversations. This was important when working with students who might prefer to ask for verbal clarification of questions before committing a written response to paper. The activity was designed to take approximately 15 to 20 minutes to complete. Participants were invited to answer any number of the questions. The focus of the activity was an exploration of what makes a great place for learning from the
These perspectives were compared with data generated from the staff interviews.

Refinements to data collection approaches

As a result of the first study, data collection approaches were refined in the following way. I planned my data collection around two sets of observations: whole school and a specific example or section within the case. Despite some difficulties with the staff and student pilot activities, I decided to retain the interview and participant-generated photographs data as valuable collection activities but was prepared to review their use with each case. I purchased disposable cameras with pre-paid developing to eliminate any difficulties with access to photographic equipment. I also invited participants to consider using other visual representations, such as drawings. The invitation to be involved in the participant-generated images activity was attached to the “Great Places for Learning” questionnaire. I thought the experience of working with the display of photographs would enable and inspire participants to give their own visual response. However, I did anticipate the success of participant-generated images activity would rely upon finding a “champion” teacher within the case study school. In the pilot study, I was able to use my own collegial relationships to get the activities completed. I was present at the school full-time, more flexible with times and could push the research along on a daily basis. With the remaining cases, I was only going to be at the schools for a number of day visits, and between those visits I was going to rely upon the support of key personnel and participants. I still planned to use semi-structured interviews with staff. If they did not participate in the participant-generated images activity, I could still interview them using the “Great Places for Learning” photographs as a focus for dialogue.

Data collection at Grevillea College

With the second case study, Grevillea College, I focused on the provision of physical environments to support the Middle School’s pedagogy and curriculum. Site visits were conducted in four days over a period of four weeks in the last term of an academic year. Contact with the college and participants, for the purpose of data collection, was maintained over a period of nine months. Five sources of data were
used: documents, researcher-generated photographs, field observations, interviews and a questionnaire. In addition to the educational leaders, four Stage 3 teachers (one male and three females) and thirty-two Stage 3 students (12 males, 15 females, 1 no return on gender) participated in the study.

Site maps, architectural plans, statements of founding vision and goals, a copy of the current school timetable, college prospectus, parent handbook outlining Middle Schooling at Grevillea College and current rooming allocations provided the case context, as well as establishing the organisational structure and overt school culture of Grevillea College. During site visits, I made field notes, sketch maps and a researcher-generated photographic survey of the built environment, using cluster sampling of sections of the physical environment, especially spaces most likely to be retained according the recently devised master plan. Photographs (totaling 114) surveyed the overall orientation of the site, location of each of the three schools, shared educational facilities, as well as features currently attributed to best practice in building design that supports innovative pedagogy. Observations of the outside learning areas, library complex and flow of the overall site were made at different times on different days. Interviews were conducted with the Principal, Bursar and Head of Middle School. These were individual, semi-structured and 20 minute audio-taped interviews. Individual, semi-structured interviews were conducted with Years 5 and 6 core teachers. Audio-taped interviews were transcribed verbatim and reviewed for accuracy and additions by the participants. The “Great Places for Learning” activity was used with Years 5 and 6 students and their teachers. The photographs used in the activity were selected on the basis of two criteria: the images reflected learning environments in the school actually used by or familiar to the Middle School students and the images reflected characteristics of a learning community as identified in the literature.

Data collection at Acacia College

Three research visits to the third case school, Acacia College, were conducted over a period of ten weeks spanning Terms 2 and 3. As with Grevillea College, fives sources of data were used. Documents used included the Stage 6 programmes, staff
and student handbooks, the college’s prospectus, the annual report and architectural plans. The college website was accessed at different points throughout the project. Interviews were conducted with the Principal, Head of Junior School and College Manager. Six Year 6 teachers were approached for an online interview via email. I also engaged in a series of informal conversations with the Principal and College Manager. During site visits to Acacia College, I made field notes, made sketch maps and a researcher-generated photographic survey of the built environment, using cluster sampling of sections of the physical environment, especially spaces most likely to be familiar to Year 6. Photographs (totaling 126) surveyed the overall orientation of the site, shared educational facilities, as well as features currently attributed to best practice in building design that supports innovative pedagogy. On the day I collected the Researcher-Generated Photographs (RGPs), I was not as free to wander and collect these images independently as the Head of Junior School was conducting the walking tour. However, I was confident the range of photographs was representative of the college because I had made a number of visits to the college over the space of two years and I knew the property well. I had detailed site maps and on previous visits I had been given a number of walking tours. Google Earth Maps was a useful addition to the site data. I was also left alone to make my field observations in the playgrounds during meal breaks. Observations of the outside learning areas and flow of the overall site were also made at different times on different days during my visits. The “Great Places for Learning” activity was used with a sample of Acacia College Year 6 students. The activity was conducted in one of the Year 6 classrooms during morning lessons. Students were sent in small groups from different home groups to complete the questionnaire. Photographs used in the display were selected on the basis of two criteria: the images reflected the learning environments actually used by or familiar to the Year 6 students and the images reflected characteristics of learning community as identified in the literature.

As with the Grevillea case, the Participant Generated Photographs data collection activity was not used with Acacia College. I had anticipated Participant Generated Photographs would be a difficult tool to use in this study. The main reasons for this difficulty appeared to be: busy college schedules and overcrowded workloads. The
college was undergoing a large inspection by the state registering authority during my visits and students needed the support of a teacher (other than the researcher), who would be prepared to follow through on the process. This proved difficult to achieve. This activity was affected by the participants’ willingness to participate versus the “pester-power” of a researcher who is not present on site. I believe the e-mail interviews with Acacia staff also suffered from the same challenges, and thus led to few returns.

4.4. Data Analysis

Data was systematically analysed using constant comparison within each case’s dataset with the purpose of arriving at a coherent, legitimate account of each school that was keenly attentive to the participants’ words (Pringle et. al., 2011). Analysis was non-linear and interactional, with cross-case analyses held together by a convergence of data and a chain of evidence (Yin, 2003; Yin, 2009). Data analysis involved periodic reading of data and logic checking and comparison, using thematic coding as it emerged from each data set and with the purpose of focusing and organising the interpretative analyses. Judgement was key to interpreting the findings, and data analysis was an ongoing process that emphasized the situated nature of interpretation (Kinsella, 2006). It was more important to understand each individual case on its own terms than seek cross-comparison findings. Given the small size of my sample in comparison to the number of schools in New South Wales, I anticipated the scope of generalisation would be modest, but relevant to schools that identified with the profiles of my case schools. However, by using the same research questions and interpretative approach to analysis, a cross-case comparison was possible and strengthened the findings of my study. The cross-case component emerged after the analysis of each within-case dataset.

My first level or phase of analysis involved the documents I had collected, the first observations I had made when visiting the case schools and the photographic survey I made of the physical learning environment. This analysis gave me an understanding of the case context and my own impressions of how the relationship between
learning and school design appeared in this context. To this analysis I added further understandings drawn from the interviews with the educational leaders. These interviews brought in aspects of leadership and the design process. The second level or phase of analysis involved some initial organization of the themes that were emerging by comparing the various accounts and observations. I then added the other meanings generated by the teacher and student voices. These participants worked in the places and spaces that I had observed and the educational leaders had planned, so their perspectives created meanings about the post-occupancy experiences of those who use the spaces as a place for their daily work. The data was periodically examined for similarities, differences, correspondences and themes within the different perspectives and within the case as a whole over the extended period of time that it took to conduct each case study. For example, staff and students at Grevillea had identified the new library as an inspiring learning space that they liked to use because of its contemporary styling, access to interesting spaces and information technology. I had already identified the potential of this space to support a learning community culture and the principal had used the space to illustrate some ideas of a great place for learning. The master plan for the site also located the building as a potential learning hub for the Middle School.

The codes and themes generated were flexible but were helpful for organizing the findings into meaningful themes that ran through the case study. My researcher-generated photographs of the colleges’ educational facilities and outdoor spaces were compared to the features of learning communities using the table I had devised (see Chapter 3 and Appendix 31). The photographs displaying a broad range of features that were representative of the college’s facilities were selected for the questionnaire display. I used the same characteristics most commonly used in literature to describe a learning community to help me analyse the documents and responses from participants. While there was no expectation of a certain number of aspects or indicators being present, it would not be unexpected for the cases to reflect some of these characteristics as each of the schools had expressed some association with the notion of learning communities. For example, both Grevillea and Acacia were organising their sites into smaller communities of facilities designed around the
learning needs of a single cohort (Year 6) or Middle School. Their master plans showed layouts that would build smaller communities within the campus, linked to one another but able to operate separately on a smaller scale.

When analyzing the interviews transcripts and questionnaires, emerging themes and points of concern or interest to the participants were also coded. For example, issues relating to inadequate storage or creating a sense of belonging to a place. These codes reflected factors that influenced the relationship between the built learning environment and learning from the point of view of the participants. The themes were compared with current literature relating to the design of educational facilities and post-occupancy evaluation tools. The purpose of using these codes in this analysis was to recognize meanings as they emerged from the participants’ words and build an understanding of points where the data converged. The theme codes are listed in Appendix 4.

The dataset for each case was analysed and findings reported separately in the following chapters. The findings were then organised around the notion of multiple perspectives. These were the perspectives of the different stakeholders involved in the study. Only the first study involved the use of Participant-Generated Photographs, and this data were analysed in the same way as the interviews. I anticipated a small but significant cross-comparison between the case studies could be made through consideration of the most frequent factors that influenced the relationship between educational facilities design and learning.

The chapters that follow deal with each case study in turn. Each case study chapter is structured in the same way, with background and contextual information unique to the school discussed before moving onto an analysis of the built learning environment. The discussion of the study’s findings is organised around the multiple perspectives of the participants. In each study, all participants have been given pseudonyms to protect the identity of the school. In the final chapter, I discuss the study’s key findings and implications of the research.
Chapter Five: Case Study - Jacaranda College

5.1. Introduction

The following findings report on the relationship between the built environment and the learning environment at Jacaranda College as seen from the multiple perspectives of the researcher, the educational leadership team, teachers and students, with a particular focus on the process of designing a new building. The findings also report the nature of the learning culture that existed at Jacaranda and its relationship to the physical environment. Jacaranda College was selected because it fitted the selection criteria of being a recently established school that was independent in the areas of school design and constructing its own educational facilities. The college was also commencing a new building project. This case was the first study for the research project.

5.1.1. Background Information

A number of different lenses were used to observe the college. As already discussed in Chapter 4, it was necessary to see the college from a variety of perspectives that would provide an impression of the relationship between learning, school design and leadership in all its complexity. One perspective was that of the researcher. I was familiar with the buildings and the overall site layout. Staff had been introduced to the research project through a formal presentation at a weekly staff meeting, where I clarified my role as the researcher and the project itself. Issues of confidentiality were explained and consent forms distributed. I made it clear that participation was purely voluntary. Throughout the duration of the project, I talked informally with staff and students about their spaces for work and learning, as well as conducting all but the questionnaire data collection activities already explained in Chapter 4. Seven teachers (mainly secondary staff) from a staff of thirty-two returned annotated responses for two or three photographs. One teacher was selected for a follow-up interview, due to the complexity of her annotated photographic responses. I listened
to staff members and students through formal interviews, read what they had to say about photographs of chosen places for work and learning and recorded observations of the design aspects of the built environment with photographs.

When setting up the research project with the college, I had decided to focus on the new building project as a pilot study and in particular investigate the design process. The new building was more complex than any other that had been erected at Jacaranda and appeared to offer the potential of implementing learning community design. However, this building was not ready for occupation during the project. Therefore, I also used the whole school site for consideration when I invited staff and students to participate in the research activities, which meant students and staff could give their perspectives on other areas currently in use. Thus the study maintained a sense of the whole college context and ensured participants could comment upon spaces of which they had experience. I retained the focus upon the new building project in the interviews with the educational leaders in the school and the architect, and was able to follow-up the impact the new building had upon the colleges through ongoing contact with Jacaranda.

5.1.2. Context

Jacaranda College is a fully accredited and registered Kindergarten to Year 12, co-educational college in New South Wales. The college is classified as a metropolitan school11, situated in a semi-rural area that is experiencing urban growth on the fringes of a city. It is an independently owned, non-denominational, faith-based educational institution comprising two college campuses (one of which is Jacaranda) and is governed by a school board. The workday is structured around eight periods (40 minutes each) with a five day cycle. Even though the college is K-12, all departments of the school share the same bell times and the day ends at 3:20 pm.

The profile of the local population is a blend of long-term residents, young families who have moved into the area’s new housing developments and retirees. The area

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11 Classification by the national ACARA website, My School.
surrounding the school college is described as predominately working class with some remaining pockets of rural employment, with students tending to come from a lower socio-economic group. The college’s SES\textsuperscript{12} number and the Australian Bureau of Statistics 2006 Census support this observation. The local commercial areas are large and designed to support people living in the immediate vicinity, as well as visitors to the area. Multiple suburbs and large townships combine to form the local government area, rather than a single densely populated urban hub with surrounding suburbs radiating from a central business or government or cultural district. It was from these dispersed suburban communities that the college drew its enrolments, which meant students were not necessarily local to the school and did not share neighbourhoods with each other after school. Therefore, Jacaranda was a community that was substantially built during the school day. The college is on the edge of one of the townships in a less populated area. Students access the school by bus and private car. The site is isolated and the nearest urban development is a couple of kilometres away. There is no public transport access to the college and pedestrians do not pass the school during the day. Rural properties form the boundaries of the college.

The campus was established in 1996. The college had established an organisational structure that divided the student body into two departments, K-6 (Infants/Primary) and 7-12 (Secondary). Originally the plan was for a smaller college that had one class per year from Kindergarten to Year 10. As the college enrollments grew and the local area developed, the college extended to Year 11 in 1999, followed by Year 12 in 2000. The anticipated enrollment in 2008 was 450, with four classes of students per

\textsuperscript{12} SES: Socio-Economic Status indicator measures the socio-economic status of the parents whose children are enrolled at a school. Since 2010, the Commonwealth Government uses the number to determine levels of funding and grants each non-government school is eligible to receive. This indicator was replaced in 2010 with the Index of Community Socio-Educational Advantage (ICSEA), which includes parent/household educational background in addition to social and economic characteristics.
stage\textsuperscript{13} in Year 5 to Year 12 and two classes per stage in Kindergarten to Year 4. Annual tuition fees were less than $5000. According to the 2008 Annual Report, the college promoted a strong belief in community amongst its students, staff and parents and one of the stated goals of the college is to encourage and enable students to develop and use their abilities. College policy documents, such as the Curriculum Preamble and Welfare Policy, indicated positive, productive relationships were foundational to the college.

The Principal had the overall responsibility for both this college and a second college. Appointment of staff was a shared responsibility of the Principal and School Board. The Business Manager and a Head of Campus supported the Principal. The Head of Campus was responsible for the daily management of the college. Under the educational leadership of the Head of Campus and the Secondary and Primary Coordinators, the college staff were responsible for developing teaching programmes that represented the learning needs of the students and the educational outcomes of their particular stage of schooling. The curriculum complied with New South Wales Board of Studies requirements, whilst maintaining the overall learning, philosophical and educational goals of Jacaranda College, as evidenced by the extensive materials prepared for the registration inspections conducted by the New South Wales Board of Studies every five years.

Since 1996, the college’s buildings have been erected on a needs basis according to student enrollment growth and availability of funds rather than developing the site according to a master plan. All students from Prep to Year 12 were situated on one site, called Jacaranda College (see Figure 3). Facilities such as the library, administration buildings, car park, an outdoor basketball court, oval and a small meeting hall were shared by all departments (see Figure 3 for their location on site

\textsuperscript{13} At the time of this case study in New South Wales, a “year” refers to grouping students in cohorts according to their age and the number of academic years they have been in school education. Each year may have a number of classes. Students are usually five years old during their first year of school, which is called Kindergarten. Therefore, Year 1 is the second year at school, and the final year of secondary schooling is Year 12. “Stages” refers to the pairing of “years” from Years 1 to 12. There are six stages in the New South Wales Board of Studies curriculum and accreditation structure. Schools adopt the terms “year”, “stage” and “cohort” to define both structural groupings of students and the curriculum.
and their positioning in relation to general classrooms). Up until 2008, as already mentioned, the college had not used a Master Site Plan for the development of campus’ facilities. A consulting architectural firm had recently been engaged to develop a plan for all future buildings projects. One of the reasons for not requiring a master plan until this point of time was the nature of the site. The college was situated on a large piece of flat land, making it relatively simple to place one building after another next to each other as the college grew, without significantly impacting the playgrounds and oval. The college had not envisaged growing beyond an enrolment of 380 students, which meant planning the site was simple as only of every type of facility was required. However, by 2008 the college had grown where the layout of the overall site had become crowded. At this point, the campus recognised it lacked cohesion in terms of design and relationship between each of the buildings, which a master plan would have provided. Therefore, a decision was made by the Principal and Business Manager to engage an architect to develop a new plan that incorporated the current facilities and made provision for future buildings should the college continue to grow. The senior leadership team (Principal, Head of Campus, Business Manager) said in the interviews and informal conversations, that the design of school facilities was becoming more complex, so more planning was required to cope with new building requirements. The architects were also engaged to redesign the layout of the teaching areas in a new building project that was ready to commence at the time of this study. This facility became the focus of this pilot study (see Figure 3 for sketch map of the new facility).
Figure 3: Jacaranda College (source: researcher)

Figure 4: The new building project (source: researcher)
5.2. Spaces learning environments: multiple perspectives

5.2.1. Spaces as learning environments: the researcher’s perspective

I was already familiar with the physical site and I had an understanding of the daily workings of the school community, the routines and ways of doing things at Jacaranda. In short, I had knowledge of the school culture. However I had never looked at the physical environment through the perspective of a pattern language as it might relate to school design. Therefore, I sought to re-acquaint myself with the college’s physical environment and took a tour of the college using the pathways and signage as my guide, recording my observations of the environment in a series of photographs. These photographs allowed me to distance myself from any personal views I may have held of the facilities and looked at what was actually there from an architectural point of view. The researcher-generated photographs of Jacaranda’s educational facilities and outdoor spaces were then analysed using criteria I had devised (refer to Table 6 in Chapter 4), which were informed by current literature in the field of school design and learning communities and already discussed in detail in the Methodology chapter. I was able to add to my photographic survey at the beginning of the following year, when the new building had been finally occupied, thus demonstrating the ways in which the new classrooms had been furnished. A selection of these photographs is included on pages 112 to 117, and is referred to throughout this chapter.

Jacaranda College’s facilities had numerous examples of an indoor/outdoor connection between the learning spaces and the outdoor sporting/recreational areas, as shown in Photograph A. Due to its development in response to the needs of enrollment growth, the college comprised a series of isolated buildings that were connected by pathways and covered walkways or connected by line of sight, that is, you could see where you wanted to go and could head directly “cross country” to the next building as shown in the exterior shot, Photograph T. Other than the new building, all classrooms opened directly onto to the playground. The new building was the first classroom area (see Figures 3 & 4) to use a shared internal corridor as the means of access to the rooms. This was going to be a different experience for
students and teachers, but the building was not occupied during the period of time in which this study was conducted, so I was not able to investigate the impact of this corridor on pedagogy and indoor/outdoor connection.\footnote{Since this study was completed the building has been occupied, predominately by secondary classes. I have observed some variation to the way the rooms are used in comparison to the rooms that are on the ground floor and open out into the playgrounds. Teachers have modified activities that would have usually made use of outside areas for groups working collaboratively or classes have changed rooms because equipment/resources could not be taken upstairs.} In school design, it is argued that a sense of locale and visual connection to the outside environment is important for developing a sense of belonging to a community and a local area (Nair & Fielding, 2007; Bergsagel, 2007) (refer to Photographs E & F which show views of the outside grounds from the windows in Prep and the teachers’ common area). From the established buildings, it was easy to look out into the playground and beyond to the local properties, especially where there were plenty of windows (some even reaching from ceiling to floor). In the new building, the new internal corridor reduced the number of windows per classroom, and the view of the outside from the position of sitting was very limited, as shown in the exterior and interior images of the new building (Photographs f & C). The second storey had created a new opportunity for a panoramic view of the local countryside but the building was orientated in a certain direction so that the classrooms did not have full advantage of this indoor/outdoor connection. The entry doors to the shared corridor afforded the best view from the second storey as shown in Photograph B. Being on the second storey also meant the classrooms did not have the shade of overhanging verandahs and walkways, so window coverings were installed, which further obscured much of the view (shown in exterior shots, Photographs C & D).

According to current school design literature, way finding signage, pathways and a welcoming entry are key for orientating visitors and facilitating connection with the learning community (Nair & Fielding, 2007; Bergsagel, 2007). At Jacaranda, the primary entry into the college was confusing. Signage was limited, pathways did not connect directly with the main entrance to the college. The main pedestrian path led from the bus access road, which was not used by visitors who accessed the pathway from across the carpark (Photograph G - main pathway). These paths led through the
playground area and from the carpark before you reached a cluster of buildings, one of which was the new building. At that point signage was absent, and therefore difficult for visitors to locate the Administration Office (shown in Photographs H & I which depict pathways between buildings and the entrance to the Office). The movement from the Main Entry to the Administration Office does not flow sequentially, as a result of early building project decisions. The Administration Office was located to the back of the site and the entry doors were small and obscured by posters and notices (shown in Photograph J). While students and staff might navigate by experience and insider knowledge, for a visitor or for a school community member who had not used a particular part of the campus, navigation would not be easy. Pathways and covered walkway suggested routes to other parts of the college but signage was limited and there was no overall campus map on display by which students, staff or visitors could navigate.

Spaces for supporting teachers in their professional roles were provided in the new building and existing secondary faculty staffrooms (sufficient to accommodate five to six teacher work stations) located throughout the campus. The new facility provided preparation spaces, an informal eating area and one group space for professional development and two smaller rooms for collaboration, presentations and round-table discussions. (Photographs K, L & M show the kitchen, meeting and preparation spaces in the staff facility) The new spaces provided a food preparation area and sufficient seating for the number of adults on staff, which had been absent in previous staff facilities. These facilities were designed to support collaboration and interaction between staff. The new areas provided a great deal of space for staff activities, and after occupation, the staff said the new facility was very effective in supporting their work.

Personal storage for students was limited (Photographs N, O & P show students bags outside rooms during lessons throughout the college). The exception was the purpose built Prep\textsuperscript{15} facility, where personalised pigeon holes were provided in the reception.

\textsuperscript{15} In New South Wales, Prep occurs in the year before children are eligible to commence school. It is not compulsory for children to attend a Prep programme.
area of this building (Photograph Q shows the pigeon holes). Prep students spent the entire day in the one compound, so the facility was a self-contained home base (Photographs R & F show the covered area and its relationship to the other spaces in the Prep building). K-6 students had a homeroom, whilst Years 7-12 moved from classroom to classroom. I noticed students gathering informally for eating and socializing in the playground areas, where there were seats and some shade (Photograph N & O). These areas were sited amongst the buildings, and different age groups were assigned different areas (see Figure 2). Use of outdoor recreational areas and informal gathering spaces was weather dependent.

The college was able to develop its own style independently of the influences of any local architecture or restrictions, since the college was set in a rural area and isolated in relation to other urban developments. Visually the college had maintained some similar design elements throughout its building projects (for example, steel pitched roof lines, brick exteriors, colour scheme – as shown in Photographs U & D of the exterior) but some of the projects had involved the erection of demountable buildings that could not maintain these elements, an example is shown in Photograph A. These buildings are also known as portable and temporary module buildings brought onto the site on the back of a truck in sections and assembled on location. The Principal and Business Manager said this was not preferred option but often issues of affordability and student enrolments demanded a cost and time effective accommodation solution. These factors of constraint and affordability are explored in the next section. Consequently, there was little visual unity across the campus and architecture was not used to cue knowledge of the different sections of the campus.

Classroom size, condition\(^\text{16}\) and resourcing varied across the campus. The junior school (K-6) was accommodated in some of the demountable buildings (Photograph N), some permanent rooms in a larger building that housed the small meeting hall\(^\text{17}\) and two classes were due to move into rooms in the secondary section of the campus.

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\(^{16}\) Condition refers to the state of repair of the facility.

\(^{17}\) The meeting hall could only accommodate 50% of the college population at one time (approximately 230 students).
at the time of writing. Figure 1 shows how the junior section of the school was
dispersed across the campus. The K-6 classrooms were each set up as home bases
and resources such as whiteboards and teaching resources were duplicated in each
one. Technology such as data projectors was shared between a number of rooms. The
demountable rooms had operable\textsuperscript{18} walls between two of the three rooms (shown in
Photograph W), designed to facilitate collaboration between two classes. The rooms
were small in relation to the number of students using the space, and therefore,
tightly packed with furniture (see interior of a variety of classrooms in Photographs
V, X & Y). Even though classes had set up a variety of desk configurations, the size
of the rooms did not offer opportunities for reconfiguring the spaces for collaborative
activities that required floor space or quiet break-out spaces. Staff made maximum
use of the available storage space and display areas along the walls by installing
pinboards, fixing posters on the windows, using string lines across the room and
free-standing cupboards. Within the K-6 classrooms students had personalised
storage and work places in terms of trays and desks.

Access to Information Technology was provided to students through two computer
laboratories with 26 desk machines in each room (Photograph d). Class access was
timetabled. There was an increasing provision of data projectors across the college,
and there were plans for expanding the wireless network. Portable technology and
extended wireless network were anticipated as part of the future development of
resources on the site.

The recently developed Prep facility was more innovative with multiple learning
spaces, mobile furniture, flexible layout, variety of spaces and large sliding doors
that could be opened to connect the covered outdoor area with the interior space.
Student toilet facilities were included in the building, as were staff preparation and
recreational spaces (see Photographs Z, F & R). Everything designed for the children
in this building was height appropriate for the students. These educational facilities

\textsuperscript{18} Movable walls that can be folded away to allow for spaces to be joined together.
were highly reflective of the learning community design features, according to my criteria.

Before the new building project, the secondary classrooms were clustered together in one section of the campus and offered a full range of specialist and “life skill” facilities (for example, computer lab, art room and science laboratories – as shown in Photographs b, c & d). The science laboratories were larger than other rooms and demonstrated more flexibility in terms of the activities that could take place within these rooms as shown in Photograph b. The secondary general teaching areas (GLAs) were newer than the K-6 classrooms but were as crowded and limited in terms of storage (as shown in the interior shot from the front of the room in Photograph f). Some of the older rooms had movable (operable) walls between pairs of GLAs, but these walls were not used during the day to create flexible spaces. Instead they were opened when a larger space was required for a special event such as examinations. In the new building (refer to Figure 3), all the classrooms were designed as general learning areas and were set up for one style of delivery. The mode of delivery was from the front of the room where the whiteboard was located. The rooms were furnished with hard seating and individual note-taking sized desks. The furniture was not adjustable and there were no moveable walls between the separate rooms (see Photographs f & g). As already explained in a previous section, this building’s layout had been redesigned by the architect just before construction. The extent of the changes the architect could make were limited by the time they were engaged to redesign the building. The site of the building, its purpose, its external dimensions and the available budget were already fixed. Therefore, this new facility provided the five secondary classrooms required by enrolment growth but they were located in the middle of the K-6 section of the college (see Figures 2 & 3). Whilst the campus was small and the walk between buildings short, the isolation of these rooms on the only second floor in the college is likely to limit opportunities to access specialist spaces or utilize resources located in the secondary area (external access to top floor is shown in Photograph H). Amounts of natural light and ventilation varied from room to room in the new facility according to orientation and position of the room. Both personal comfort features and safety issues were affected by orientation of the
building and the second floor location (for example, screens had to placed over the opening windows to prevent students from falling or to block direct sunlight). Two of the doors in the communal corridor were placed close to one another and there was only one access door to the entire floor. This is likely to affect student flow, circulation patterns and acoustics in these rooms (see corridor shown in Photograph a). The design patterns of flexibility and transparency that are typical of collaborative designs (Nair & Fielding, 2007) were not evident in this facility, which means classes would work in visual isolation from the rest of the college community and could not vary classroom delivery modes. Once furnished to accommodate the average secondary class, the rooms appeared crowded and anticipated a non-collaborative learning style (Photograph g). Other than the central access corridor, there was no space to provide breakout areas for small groups or individual quiet work areas. The Property Manager suggested the problems and limitations of the classrooms were recognised but the college did not have the financial resources nor the time to make substantial changes to the design of this facility. However, the architect’s new arrangement of the second storey achieved a number of improvements on the first design, according to the Property Manager.
Photograph A: Indoor/outdoor connection. Demountable/temporary accommodation next to permanent buildings from different stages of growth.

Photograph B: Secondary storey of new building showing indoor/outdoor connection and sense of locale. This is the only access into the corridor.

Photograph C: Staff facilities downstairs have direct indoor/outdoor connection. Five secondary classrooms upstairs have fewer windows than classrooms on ground level and less protection from the weather.

Photograph D: New building project to the right and previous building (library) to the left. Key design elements have been continued throughout different stages.

Photograph E: Indoor/outdoor connection through full length glass doors and large opening windows in staff area. Looks out onto K-6 playground and classrooms.

Photograph F: Indoor/outdoor connection from classroom (Prep). Ground floor access to playground.
Photograph G: Main foot access path from front gate towards the buildings that are located at the back of the property. Path goes through K-6 playground area.

Photograph H: Main path meets other paths. Administration Office is still further on behind the building on the left. New building is on the right. Two sets of stairs lead to second storey classrooms.

Photograph I: Administration Office

Photograph J: Entry door to the Administration Office.

Photograph K: Staff food preparation and informal eating area in the new building.

Photograph L: Staff preparation area in the new building.
Photograph M: Staff professional working space. Clusters of tables allow for collaborative work and collegial discussions. There are also two private meeting rooms.

Photograph O: Student bags stored outside classrooms. Paths providing way finding cues around the secondary section of the campus.

Photograph N: Student storage. One of the demountable/temporary buildings.

Photograph P: Student bag storage and seating.

Photograph Q: Personalised student storage indoors in Prep.

Photograph R: Covered outdoor learning space in Prep. facility.
Photographs S & T: Informal eating areas for secondary students. Navigation around the campus is by following pathways or “line of sight”.

Photograph U: Consistent design elements create a signature style between different building projects. The building at the back of the photograph was built ten years and the building to the right was built eight years prior to the double storey building (photograph taken from new building window).

Photograph V: K-6 classroom

Photograph W: Classroom with moveable wall in demountable/temporary building.

Photograph X: K-6 classroom showing student work on display and storage along the wall. Desks clustered for group working.
Photograph Y: K-6 Learning Support classroom.

Photograph Z: Prep. teaching spaces and doors leading into staff preparation and storage areas.

Photograph a: internal corridor in new building and two classroom doors close to one another. Restricted circulation and acoustics issues to be expected.

Photograph b: Science laboratory. Two different activity areas - bays for experiments and note-taking desk area and teacher demonstration bench. More room proportionally than other secondary GLAs.

Photograph c: art room.

Photograph d: Secondary computer laboratory. Similar layout and concept is reproduced in a second room for use by K-6 classes. Classes are timetabled into these rooms.
5.2.2. Spaces as learning environments: the architect’s perspective

For the architect that I interviewed, who represented the firm that had been engaged to redesign the building layout and devise a new master plan for Jacaranda, the role of a good architect is to find solutions for the client, and in order to find these solutions the nature of the design problem must be known and understood. The architect relies upon the client for this type of knowledge. According to the architect, if a client wishes to be effective they need to demonstrate three key characteristics: the ability to define and describe what is required from the building; the ability to think beyond the immediate and plan strategically for the long-term and a willingness to seek; and give due consideration to professional advice from architects specializing in the relevant area of design. The architect described the different
stages the collaborative design process might go through with a school. From the architect’s experience, he said a client team was important for the early concept discussions but as the project progressed the school’s interests become the delegated responsibility of one person:

The assembly of information, the hearty discussions about what’s required and what may be the long term aims, that’s for the team. From there on, nominate an individual to be the point of contact and give them the authority to make decisions. *(Architect)*

The architect’s contact with the new facility at Jacaranda was limited by the fact the firm had been contracted to redesign an already existing plan. Therefore, he was not in the position to comment in detail on Jacaranda’s design process. However, he had been able to reconfigure the teaching spaces according to the information supplied by the Principal and Property Manager. The financial constraints were accommodated by reducing a number of features in the classrooms and staff areas, such as eliminating fitted storage and an operable wall. So, in a limited way, Jacaranda College fulfilled the role of an effective client in the design team and the Principal was the nominated contact. A more detailed interview was held with same architect during the Acacia College study.

**5.2.3. Spaces as learning environments: the educational leadership perspective**

Although the Head of Campus was responsible for the daily management of the college, he did not play a significant role in the process of providing educational facilities. The Principal was responsible for this process. The Head of Campus described his responsibility as being “more of a consultant in that I was invited to attend some meetings to discuss issues”. He explained the types of meetings he attended were related to the initial planning, application for funding and some changes as the project progressed. He was not involved in the tendering process, selection of builders and signing contracts. Decisions were made at the very top of the leadership structure, with the Principal providing the leadership of the design process at Jacaranda College.
The Principal said the design process was a team effort involving the Business Manager (Bursar), Principal and Head of Campus. He made a distinction between the role of the Business Manager and the educational leadership. Whilst the Business Manager was involved in initiating the design process, it was the Principal and Head of Campus who were more involved because “they have greater knowledge of the day to day requirements of the campus”. The Principal when asked to rate the importance of a Principal being involved in the entire process from initial discussions to occupancy, made a distinction between when it was highly important and when it was less so:

Certainly from the initial thoughts through to the planning stages through to the development of the design and interacting with the architects. Understanding how that fits into the building master plan. Working out the details of the “where we are going” I would see it as being very high, in fact essential … The rest of the minute detail of each individual room, that would be less important because if it is a classroom, or a specialist classroom or a library facility etc., the specialists in those areas need to be consulted. They need to be able to have their input. The Head of Campus would have a more detailed understanding of the specifics. (Principal)

The Principal made the distinction between involvement that was linked to his senior leadership role and involvement that was part of a collaborative process that included other members of the staff. These comments point to a belief in individual and collaborative leadership roles and responsibilities in the process of designing educational facilities. However, the Head of Campus’ view of his role suggests collaboration was difficult to achieve and may have taken the form of delegation. The Principal saw delegation as result of the college’s structure:

We are an unusual school, having one Principal responsible for two campuses and having a Head of Campus responsible for each of those campuses … Only because our situation is different, I would think the Head of Campus picks up on a number of responsibilities that would otherwise fall on the shoulders of the Principal. (Principal)
The Principal said he enjoyed being involved in the design process, “recognising the needs, of doing the strategic planning and anticipating for the future this is what we are going to need” and then working strategically to embed these plans into the business plan. He also said the involvement was very challenging and very stimulating. He saw this involvement as enabling him to “mould them [strategic planning dimensions] into something very specific that actually suits the community and educational model of our school”. My observations of the educational facilities support the view that Jacaranda College was striving to create an environment that supported the college’s culture and context, but there were a number of constraints affecting this goal.

The Principal commented upon his professional experiences with four different architectural firms and this led him to believe a Principal needs to provide leadership and direction “so that we don’t just get a building that an architect thinks will work”. However, in his opinion the challenge for educational leaders is to balance the practical considerations and constraints with the educational goals and needs. The Principal said one of the constraints on the design was his role of providing leadership of the college as a business and as a place of learning, which led him onto discussing the role of leadership in the design process.

He argued that the Heads of Department needed to be participate in the planning process and “the refining process of what’s going on and to make sure those people [Heads of Department] are heard in terms of not just the construction but also the furnishing and the equipping of the room” (Principal). Once again, my observations and comments made by the staff to me suggest this collaboration is not always achievable. The Principal felt it appropriate for the Head of Department to take on a significant part in the process of ensuring the facilities were most effectively used by the teachers. The Principal also commented in his interview that he hoped his educational views and philosophies have had a significant impact upon the college’s educational facilities, but recognised others had also been involved in the process: “So, I would hope as leader I have an impact on it but also recognising that there are
many other people who are involved in that process.”. However, he did not specify which people had been that process.

5.2.4. Spaces as learning environments: the Property Manager’s perspective

The Property Manager was responsible for the college’s buildings, grounds and maintenance of the college infrastructure. Therefore during building programmes, he fulfilled a project manager role. When he was interviewed, the Property Manager described the process whereby he was involved in discussions between himself and the educational leadership of the college (the Head of Campus and the Principal) as to what was going to be required in the new building. As he commented, “When we nut that out, we then go forward.”. The Property Manager said the process for the preparation of funding applications and raising the budget was his responsibility and had to be completed at the same time as the initial planning discussions with the Principal and Head of Campus. So the issues of timing and the concurrent leadership responsibilities of attending to individual roles, whilst simultaneously working together as a leadership team were complicating factors in the process of designing educational facilities. For example, the Property Manager described his role as involving both individual tasks that he was responsible for carrying out independently whilst being dependent upon consultation with other members of the leadership team:

So basically it is a consultation process. I’ve been asked to draw up or get plans and then they are discussed with the executive, and from then on when there is agreement, the professionals, whether they be architect or draftsman, come in and I supervise that as project management. [Property Manager].

It seems a consultative process was the preferred approach but in reality this did not happen and the most common reason seems to be the timeframe for planning the building project. There was no indication in the interviews that anyone was excluded from consulting for any reason other than there was no time to consult. The Property Manager explained how once the design for a facility moves into the construction
stage, his role became central to all the negotiations and discussions, with the Principal and Head of Campus coming directly to him for progress reports and information. He also decided when to call them into the weekly project management meetings between the Principal and contracted building manager “so they can have the input with the builder”. The project management role was delegated by the Principal to the Property Manager early in the project. However, when asked to rate the importance of the Principal being involved in from first discussions to occupancy, the Property Manager commented,

Well, I think it is critical but not only the Principal, he needs to have all his staff involved communicating to him exactly what they need. I think it’s got to come from the teachers, the Principal and then the Principal can have discussions with myself and the architect and the builder just in fixing up any areas that are currently a stumbling block. [Property Manager].

The Property Manager assumed the consultative process was the best way to design school buildings but carrying through with every aspect of a project could not be achieved. I developed an impression that given sufficient time and best conditions for mounting a building project, the educational leadership team would have taken a more consultative approach to the design process.

A number of key points emerged from these interviews. Financial factors and procurement were significant issues and usually led to compromise in the design. From the perspective of the Property Manager and Head of Campus, these issues had a direct impact on the educational facility as the design tended to be compromised as a result of this significant constraint. The Head of Campus and Property Manager both commented that a lack funds to build the desired facility was a major factor hindering educational facility design projects and the current project was no exception. The Property Manager said it was very hard to know where to make the compromise when a budget did not match what the educationalists wanted from the building project and yet still get it right. The Property Manager explained how the process of raising funding from building grant authorities affected the design projects
and budgets, as did government building regulations and requirements. To deal with financial constraints, the Manager commented a design is often taken to a point where the project can be completed as funding becomes available in the future and at the time of writing, this was the case with the new project. Whilst it was not a prominent issue, the Principal and Property Manager did touch on the purpose of the building projects in terms of accommodating growth in student population, and both acknowledged real and potential growth in enrolments triggered building projects.

5.2.5. Spaces as learning environments: the teachers’ perspective

In contrast to the educational leaders, the teachers were most concerned with having control over their work spaces and access to resources. Personal work areas that were separate to shared spaces were highlighted, but not at the exclusion of opportunities for collaborating with other people. Relationships were seen as integral to education and facilities needed to support these interactions. As a point of comparison, the study found students also valued control over their learning environments, with a particular emphasis upon physical comfort and the opportunity to create personal spaces. Space to work and reliability of Information Technology were also factors that affected the effectiveness of teacher work areas according to some teachers. Another teacher did not like the transparency of her main classroom, which made the space feel like a glasshouse with no real boundaries and “nowhere to hide” (E teacher). She preferred a smaller room next door with fewer windows and carpeted floors, commenting it was much friendlier. Themes of physical comfort, difficulties of sharing spaces and places to work alone by choice were common to most teachers’ responses.

Having control over working and teaching spaces emerged in a number of responses. Regardless of the year groups they taught, teachers at Jacaranda wanted to exercise some control over their teaching spaces and this usually extended to having almost exclusive access to the same classrooms for themselves and their students. A number of the teachers, most from the secondary department, commented upon the practical issues related to teaching and learning environments. For example, how the
maintenance of poorly designed areas made certain classrooms difficult to use and manage, such as how doors that opened directly onto the playground were susceptible to the weather. The issue of sharing teaching spaces with other classes, subjects and teachers was commented on as another difficulty in managing work environments, and when spaces were shared the identity of that space either became complicated or had to remain neutral. As already mentioned, the teachers had not been consulted on the design of their teaching spaces. They tended to address issues in the design by making post-occupancy modifications using paint, furniture or simply renovations such as fitting shelving. These responses to inadequate teaching facilities reflected the teachers’ willingness to overcome obstacles in their own way.

The college was not unaware of the frustration compromise in a building’s design could cause but had limited options to avoid it a times, such as with the current building project. All of the secondary teachers chose to focus on the issue of control over the learning environment. The K-6 staff were allocated their classrooms each year, as were the secondary staff working in specialist rooms. The remaining secondary staff were not guaranteed the use of the same room for all of their teaching load. The secondary students moved around a great deal as well. One secondary specialist teacher had her preparation desk in her teaching room, which she loved. She found the integration of her own work space into the students’ learning space suited her work needs and preferences:

I can work largely undisturbed – not sitting in a confined space being distracted by fellow staff members’ conversations or phone calls (G teacher).

A disadvantage of combining the teacher’s preparation space with the teaching space arose when others were timetabled to teach in the classroom. Another teacher described all the modifications he had made to the classroom and concluded, “It makes me feel ‘in control’ of my work life” (B teacher) Like G, this teacher liked to work on lesson preparation in the same room where the class was to be taught.

The value of control over work spaces and the nature of collaborative work were both raised in the most extensive and complex response by a K-6 teacher (S teacher),
who had recently been relocated to a larger communal staffroom in a demountable/temporary building on the campus. She chose to respond to the questions that asked where do you or where would you like to work alone. She photographed her current work/preparation area and placed it beside a second photograph of a closed door. Behind the closed door was her old workspace, which she described as a “cosy office area”. She described the change as “very alienating and discouraging as the new area feels like an alien environment”. What she liked about the old office area was its location in relationship to the busy areas of the college, where students and staff would provide “spontaneous rich incidental contact with exchanges of ideas and sharing of work” and now she felt lonely and isolated:

I took the photo with the door shut because that is what it feels like now – an era where the door has been shut and others have taken over my favourite space (S teacher).

As indicated above, her old workspace was also associated with regular contact with others and the opportunity to discuss issues. She described her relationships as being vital to her work and so having control over her workspace was also important to maintaining the type of contact she needed. The central positioning of her previous personal office gave many opportunities for collaboration, as well the control to shut the door when she needed to work undisturbed. She commented that in retrospect she regretted agreeing to the change due to the impact the move had had on her ways of working that involved “collaborating, consulting and just mixing with work mates”. This teacher raised the notion that places for collaboration did not always develop in official or designated places, and she had realised her original office had been in an informal hub of activity. By having some control over the teaching spaces, the teacher was also able to maintain some personal space. This autonomy encouraged collaboration rather than discouraging it, because this teacher could freely collaborate with staff and students without sacrificing her own personal space.
5.2.6. Spaces as learning environments: the students’ perspective

The student interview responses and annotations on the photographs they had taken were less detailed than the teachers’ responses. The students who responded were from the secondary department. I found the students, like the teachers, valued control over their working space but placed a greater emphasis on physical comfort. Outdoor areas were identified as preferred choices for learning environments that could provide relaxing, calm work areas and room to move. In contrast to the feeling of control in the outdoor areas, feeling cramped in rooms was something a number of students raised as a negative factor in some of their indoor learning spaces. A number of students’ photographs showed chairs squeezed between fixed rows of desks, carpet caught around chair legs and rooms crowded with furniture. The students said rooms were too small for the purpose for which they were allocated. This was a point of concern for them, as it affected their ability to work independently and comfortably. As one student explained in the interview, “it makes you feel trapped to the desk” (P, secondary student) and took a photograph of the problem desk area. In the student interviews I explored these dual issues of being comfortable and having enough space to work. The students focused on chairs as being a key factor in physical comfort. When I asked them to describe their studies at home, their concept of comfortable workspaces became clearer. The two student participants described areas that they had organized. The spaces were furnished with large working tables, access to computers, flexibility to clear space for work and resources organized around their table. They had control over lighting, views of the outdoors, ambience (one student had a fish tank positioned to create a calm atmosphere), distractions and ventilation.

5.3. Discussion

The leadership interviews and the architect’s comments highlighted the importance of leadership and the complex nature of the process of designing educational facilities. According to these interviews, leadership involved both individual and
collaborative responsibilities. The Principal’s role was viewed by the Principal and others as central to the process as the main leader within the school, but the responsibility of project management was delegated to the Property Manager. For the architect, having one contact throughout the project was important because working continuously through a collaborative client team was not effective. To some extent the Principal and Head of Campus echoed this perspective but not necessarily in such specific terms. Designing and building the facilities was a cyclical process of discussion, turning concepts into plans and dealing with the practical considerations of building. Practical project management issues were complex and timing was complicated, therefore much was expected of leadership over a relatively long period of time. The key role of strategic planning was mentioned many times by the Principal and implied by the Project Manager.

The other significant issue raised by the Principal and Property Manager was the impact finances had on the design of the facilities. This type of school operates as an independent company, so it is entirely responsible for balancing the budget and sourcing the necessary money. As the Property Manager commented, it is at times a compromise between what is planned and what can be achieved, and therein lay the pressure to make the right choices. There were differences in emphasis upon the factors involved in designing educational facilities amongst the participants and this is possibly due to differences in their leadership roles and responsibilities within the college structure. The college was also affected by its community’s low SES profile and physical isolation. Many of the families could not afford to contribute additional funds to building projects and the college could not simply raise fees. The college could not access local community facilities, such as playing fields or community halls, thereby increasing the variety of resources available for use by the teachers during the school day. Jacaranda had to be totally self-sufficient.

The single overriding factor that most affected the design of Jacaranda’s facilities from its beginning was affordability. Quite simply the desired facilities were too expensive to build. This was the combination of a number of things, such as available funding, cost of construction and the expense of establishing a new school.
A significant financial factor with the new building that featured in this study was the introduction of new building requirements by the government. These new specifications added considerably to the cost of the project without adding any educational dimension or benefit. Therefore, the cost of compliance diverted the resources previously allocated to features that would have directly supported pedagogy, such as integrated Information Technology resources, fitted storage and adjustable furniture. Coupled with mid-project adjustments to the budget due to new compliance requirements were the delays that resulted from these changes, as well as the usual building delays due to supply, the consultative process and weather. To get the project finished near to budget and in a sensible amount of time elements of the design were eliminated (for example, storage) with the intention of eventually finishing the total design after occupation. Unfortunately, this did not eventuate. This issue of affordability in schools such as Jacaranda will be explored further in Chapters 6 and 7.

Separate to the new building project, there were other long term factors that affected the design and construction of physical learning environment at Jacaranda. During the time that I have worked at the college, I had seen no less than three building projects and numerous refurbishments take place, so was familiar with the trends. The first factor was the problem with site planning and college growth. Jacaranda had not intended on being as large as it eventually became, therefore, the facilities had been originally laid out on the site for 40% fewer students. With the growth came problems with distribution of resources and specialist facilities, as well as the provision of sufficient general classrooms in the same section of the site allocated for the accommodation of the different departments. Linked to affordability, it was not possible to knock down or relocate facilities that were now in the wrong place. Hence, the lack of a master site plan for a larger college had a direct effect on the way finding and neighbourhood development within the college.

Another long term factor affecting the design of the college was the dominant pedagogical approach, which emphasised a more traditional approach by organising the classroom around one teacher in charge of thirty students in spaces that were set
up for instruction from the front of the room. The existing teaching programmes and approaches did not necessarily make use of the flexibility provided in the facilities. For example, the operable walls were rarely opened and collaborative teaching programmes were rare. In the main, modes of teaching were “from the front of the room” delivery and one teacher with one class with one configuration of the space. Without a pedagogy that demanded specific design features, various elements of the design that were not seen to be necessary for the dominant modes of delivery at Jacaranda were not preserved whenever a project had to be changed. More radical design features were often included in the initial plans more for the purpose of being contemporary than integral to a specific pedagogy. Stakeholders may have also surrendered features in the design because they did not see or use the affordances present in those facilities.

Associated with the factor of dominant pedagogies was the complexity of the design process and potentially problematic relationships that can exist between the educational leaders and architects. In the past, Jacaranda had decided not to use architects. The main reason given was that architects did not listen to what the college wanted. With the new building project, the college had initially decided to design the building in-house with the assistance of drafting professionals and a builder. However, this changed when the complexity of the building was realised and an architectural firm was engaged to draw up a master plan. This firm redesigned the project’s internal layout but with many decisions already made, it was difficult to effect a more innovative floor plan for the classrooms. The current classrooms also suggested to the architects that a relatively traditional approach to teaching and learning was preferred at this school, so the new design did not differ from most of the college’s existing facilities.

Another factor that affected the relationship between the learning spaces and learning culture was the size of the classrooms. In the main, the rooms were small and with classes of up to 32 students, they became very crowded. Furniture favoured the single note-taking desk and chair. One of the reasons for the size of the rooms was affordability in general, but also in particular, funding for the projects. The
government grants had stipulated the amount of floor space that was allowed per
student in a given project, and at one point all space under the roofline was included
in this calculation. This meant a decision had to be made between indoor teaching
space and eaves and covered outdoor areas. Hence, many of the classrooms had little
protection from the weather or were smaller in size in order to create some covered
outdoor spaces.

Jacaranda College’s facilities were significantly affected by a number of factors. As a
result of these factors, the facilities did not reflect the design features usually
associated with contemporary learning communities, such as flexible, adaptive,
collaborative spaces equipped with integrated technology. However, the absence of
these features did not necessarily indicate the college had no desire to be a learning
community. Nor did the design of the facilities indicate teachers did not devise
programmes that would have been enhanced and enabled by a greater provision of
flexible, well-resourced and larger learning spaces, if they had been included in the
design process.

A common theme of relationships ran through many of the teacher responses. All
teachers made reference to personally relating to their workspace, which was also at
times linked into collegial relationships. Some teachers conveyed a feeling that being
connected to their work space in a personal way was vital. Sometimes sharing spaces
with other colleagues was distracting or took an element of identity away from their
teaching space, which was understandable after teachers had described their personal
input into their classrooms.

Jacaranda College’s school college was based upon a strong sense of community and
the community was based on human relationships not physical structures. As a
school, according to my observations and what teachers and students told me, it was
evident that Jacaranda valued community building and fostering a sense of personal
belonging. The staff at Jacaranda highlighted flaws and inadequacies in the design of
many of the facilities. Common criticisms were lack of space, storage and flexibility.
However, it was evident from both the teachers’ responses and my own knowledge of
the college that limitations with the physical environment did not prevent teachers from striving to adapt and modify the facilities. College leadership was not blind to the frustration created by inadequate facilities but did not have the resources to change the situation. At Jacaranda College, people made the less than effective designs work by making small modifications (such as moving furniture to create spaces and changing paint schemes) and focusing on relationships between people. Jacaranda College could be regarded as a learning community due to the emphasis placed upon community relationships rather than physical facilities.

Overwhelming, the notion that schools are places busy with human interactions came through, and these interactions take place in physical places. When photographing the college, a few physical hubs of interaction were clear (such as the new staff facility and the students lunch seats) but one of the teachers raised the concept that there were many informal or incidental hubs of interaction within a school which are responsible for contributing to rich relationships. The same teacher also raised the link between the location of your workspace and sense of belonging to the whole school. The teachers’ responses definitely suggested the design of a building had an impact upon what took place within that architectural defined space and mattered to the relationships that exist between people sharing these places.

The following chapter reports the findings of the next case study, Grevillea College. The findings of the study at Jacaranda College refined the methodology used at Grevillea, as well as contributing to the cross-case findings that will be discussed in the final chapter.
Chapter Six: Case Study - Grevillea College

6.1. Introduction

In this chapter I report on the relationship between the built environment and the learning environment at Grevillea College, the second case study school, as seen from the multiple perspectives of the researcher, the educational leadership team, teachers and students. The findings also describes the learning culture that existed at Grevillea.

6.1.1. Background

The second case study, Grevillea College, had been established in 1998. It was an independent K-12 school in New South Wales. I determined that current school culture still articulated the foundational principles and vision in practices and documentation. The school leadership team was directly involved in the design and construction of the school. The college expressed an educational vision that was similar to the current definitions of a learning community and innovative learning cultures.

As already discussed in Chapter 4, schools are complex places to experience and understand within a short period of time and since the purpose of my study was to investigate the relationship between the physical learning environment, leadership and learning communities, it was necessary to see the college from a variety of perspectives and use a variety of data collection approaches in order to understand this relationship in all its complexity.

At Grevillea, I collected data through tours of the learning spaces, at times guided by two students or the Head of School and at other times alone. I talked informally with staff and students about their spaces for work and learning. I listened to staff members through formal interviews and recorded visual aspects of the built environment with photographs. I collected 114 photographs of Grevillea’s
educational facilities and outdoor spaces across the site on the first field visit. Before
the second visit, I analysed them using the criteria described in Chapter 4 (see also
Appendices 1 and 2), which were informed by current literature in the field of school
design and learning communities. The criteria had been revised in the light of the
first study. Twenty photographs displaying the greatest number of design features or
the images that were the clearest representations of a specific criterion were selected
for the “Great Places for Learning” questionnaire described in the methodology
chapter (Chapter 4).

The final selection of photographs drew from a small number of sites within the
school. These were: the covered outdoor learning areas; the outdoor terraced seating
and picnic tables in the playground; the large windows and verandahs connecting the
Middle School covered outdoor learning area and the neighbouring classrooms; the
library complex, covered verandah of the Art Room; the small banks of computers
and data projectors mounted at the front of a number of classrooms used by Middle
School; and Middle School classrooms where student desks were arranged in groups.
I ensured my selection showed the areas of the site that had been identified by the
staff and my student guides as the spaces or facilities currently used by the Middle
School or were the spaces or facilities in proximity to these areas, since the purpose
of the questionnaire was to find out what students and their teachers thought were
great spaces for learning. The pilot study had indicated staff and students were more
confident and detailed in their responses when commenting on spaces of which they
had personal experience, whether that experience came from using the space or
observing it due to its proximity to their own learning spaces. I had also found
responses were more confident and detailed when staff and students could use their
own terminology for discussing the features of a learning space.

In the returns from the questionnaire, I read what students said about great places for
learning. I listened to teachers and educational leaders explain their ideas about
spaces that worked positively for teaching and learning. I looked for physical places,
texts or observations that would build knowledge of the relationship between the
physical spaces, pedagogy and the people who work and learn within these spaces.
6.1.2. Context

The College

Grevillea College is a fully accredited and registered Kindergarten to Year 12, co-educational college in regional New South Wales. It is situated on one 11.4 hectare (27 acres) site in a semi-rural urban area. It is an independently owned, non-denominational, faith-based educational institution, and is governed by a school council. The work day is structured around six periods (50 minutes each) on a ten day cycle. Although the college is K-12, all departments of the school share the same bell times and the day ends at 3:00 pm. According to the Principal, this structure meant less class movement, fewer bells and aimed to generate a single rhythm for the students’ daily routines.

The profile of the local population is a blend of long-term residents, young families new to the area, holiday makers and retirees. The area surrounding the school college was described by both the Principal and Head of Middle School as working class, with students tending to come from a lower socio-economic group. The college’s SES number and the Australian Bureau of Statistics 2006 Census support this observation. The local commercial areas are small and designed to support people living in the immediate vicinity. Multiple villages, suburbs and small townships combine to form the local government area, rather than a single densely populated urban hub with surrounding suburbs radiating from a central business or government or cultural district. The school was not located in a densely populated part of the local area. It was situated as a relatively isolated independent community on the fringe of the local government area. Students access the school by bus, on foot, by train and private car. The site is isolated from large urban developments, but is embedded within the local township. Housing comes up to the fence line but population density is such that a majority of the students would still travel from neighbouring areas. It was mentioned a number of times by staff members and a student how beneficial it was to have the railway line supporting the easy movement
of students from further afield. This enabled the school to grow but was not particularly advantageous for building community links with the local area.

The Principal had the overall responsibility for the college with support of a Business Manager and an assistant Principal. The Assistant Principal had the responsibility for the management of daily organisation and operations, such as timetables and staffing. The college was established in 1998 and moved to its current site in 1999. The anticipated enrollment for 2009 was 490, with three classes of students per stage\(^{19}\) in Kindergarten to Year 8 (360 students) and one class per year in Years 9 to 12 (130 students). Annual tuition fees were less than $5000. The college’s buildings have been erected on a needs basis as funds became available. A new site Master Plan was drawn up in 2008. The purpose of this plan was to incorporate the current existing permanent structures into further staged development of the college’s facilities, whilst maintaining a relationship between the design of the built environment and the bushland setting.

The college had established an organisational structure that divided the students into three sections or departments called schools. Originally the plan was for a small college with two departments called Junior School (Kindergarten to Year 4) and Middle School (Year 5 through to Year 7). As the college enrolments grew, the next year level was added onto the structure. Curriculum was developed and facilities expanded to accommodate the new classes and programmes. At one point, the position of Head Teacher of Secondary was created, followed by Head of Senior School in 2005, when the college expanded to include the first Higher School Certificate cohort. The structure in 2008 was as follows: Junior School comprising Kindergarten to Year 4 students and staff; Middle School comprising Years 5 to 8 and

\(^{19}\) At the time of this case study in New South Wales, a “year” refers to grouping students in cohorts according to their age and the number of academic years they have been in school education. Each year may have a number of classes. Students are usually five years old during their first year of school, which is called Kindergarten. Therefore, Year 1 is the second year at school, and the final year of secondary schooling is Year 12. “Stages” refers to the pairing of “years” from Years 1 to 12. There are six stages in the New South Wales Board of Studies curriculum and accreditation structure. Schools adopt the terms “year”, “stage” and “cohort” to define both structural groupings of students and the curriculum. Terms such as Middle School, Junior School and Senior School are used to define additional groupings of either years or stages. These groupings can be both structural and pedagogically determined.
Senior School comprising Years 9 to 12. All three schools were situated on one site, called Grevillea College for the purpose of this study, and shared facilities such as the library, administration buildings, carparks, a covered basketball court and specialist teaching spaces (See Figure 4). The curriculum and student welfare were managed by the three Heads of School, under the leadership of the Principal.

The college documents emphasized the existence of a strong sense of community amongst its students, staff and parents. The school college prospectus described the college as “community-sized” and as a place that nurtures children in “a positive, creative, challenging and caring environment”. To a certain extent, the introduction of the college’s three school structure was a response to maintaining a more personal sense of community, whilst accommodating growth in the overall student population, according to both the Principal and the Head of Middle School. The college website explained the structure as the development of a "school within a school" model and each section had its own Head of School, unique programs and opportunities. The
school claimed this model of schooling “ensures that students are known, their needs are met, and issues are dealt with quickly”.

According to the Principal, under the leadership of a Head of School, each school was responsible for developing age appropriate pedagogy and curriculum that was responsive to the learning needs and styles of the students and the educational outcomes of their particular stage of schooling. The curriculum complied with New South Wales Board of Studies requirements, whilst maintaining the overall learning, philosophical and educational goals of Grevillea College. College publications and website described how students can feel part of the larger college community by identifying with these shared goals and learning outcomes throughout all of their schooling, whilst feeling a more immediate and significant sense of belonging to their current school and their current Head Teacher. On the website, one student was quoted as saying,

Middle School at [Grevillea] College is full of helpful people in a fun learning environment. The teachers are friendly and approachable and anytime students have a worry, they can talk it over. Mr - is always great to chat to as well about anything. He is our Head of Middle School and a great one at that! (Grevillea student).

Staff and students echoed these perspectives during interviews and conversations.

*The Middle School*

The Middle School had very specific curriculum the college calls the smarTrack Programme. It was devised and introduced by the Head of Middle School. This Head told me that, when he came to the college in 2006, Grevillea’s Middle School did not have a specific middle schooling curriculum nor a unique approach to learning. The college website described the concept of middle schooling as seeking “to respond to these changes by combining the best practice of Primary schooling with that of Secondary schooling”. The Middle School handbook described goals and intent for the curriculum. The Head of School, informed by his own teaching experiences and post-graduate studies, wanted a distinctly Middle School philosophy for the college,
as well as a curriculum that was research-based and relevant to the needs of young adolescents as they made the transition from childhood. Above all, he believed the Middle School experience should be fun, challenging and engaging for the students. So with these goals in mind and his experience of a programme delivered in a school in Queensland, a middle school curriculum was developed for Grevillea College. In the Forward to the 2009 Middle School Handbook, the Head observes that the smarTrack Programme had developed to the point where it,

has become a defining characteristic of this section of the College ... it is extremely rewarding for me to observe the way that each teacher and class is shaping and moulding their teaching and classrooms to match their ‘track’ focus ... I feel that we are edging closer to the vision that we have for our Middle School to be a ‘world-class educational community’. (Head of Middle School)

A brief description of the smarTrack programme is important for understanding the Middle School and the types of learning classrooms the programme generated. This curriculum was delivered in staged classes taught by core teachers and was based on theories such as Gardner’s Multiple Intelligences, Howe’s Seven Core Traits of the Millennial Generation and the practices of the Thinking Classroom. For example, the sporTrack class was designed for students who possessed strength in the area of Body Intelligence and were assessed as excelling when expressing themselves through movement. In 2008 there were three types of smarTrack classes. CappaTrack (Creative and Practical Performing Arts) was for students who love drawing, singing, painting or acting. SporTrack (Sport/Physical Education) was for students who want to develop greater fitness throughout the year and improve their general understanding and abilities in a variety of games, and thinkTrack was for students who enjoy using computers, work alone or in groups, love learning and enjoy discovering new things about the world and how things work. According to the college website the curriculum was expanding with a fourth track, eco-Track, being introduced exclusively for Stage 4 students in response to a perceived interest in the

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20 In New South Wales, pairs of year cohorts are grouped under staged curriculum documents. Middle School at Grevillea College comprises Years 5 and 6 (Stage 3) and Years 7 and 8 (Stage 4).
environment and growth in enrollments.

The middle school programme favoured integrated learning experiences and abandoned any approach that views subjects as separate areas of study. Every year, both parents and students indicate which track they wish to take by selecting the track that best answered the question “How are you smart?”. Student and parent preferences are compiled with teacher observations of the students’ abilities, interests and performance during the year, and the students are placed into classes according to expressed preferences and their teachers’ professional judgement. The Middle School Handbook explained the underlying principles behind the process in the following way, “the College will make every attempt to create the best learning scenario for their child in the Middle School. While we desire to match each student with their learning style it is important that each class had a harmonious blend of personalities that will add to the overall learning environment”. A Review Committee examined decisions relating to placements that were raised as matters of concern by the parents. Over the four years, students may experience four different tracks or choose to repeat and specialize in particular areas.

6.2. Spaces as learning environments: multiple perspectives

6.2.1. Spaces as learning environments: the researcher’s perspective

When you are a member of a community there are shared understandings and complex ways of doing that are not obvious to the outsider. On the first day of my visits, I wanted to see whether or not I could navigate my way around the site and, by exploring the built environment, glean some sense of the learning culture of the college. So I then deepened my understanding of the learning environment through contact with staff and students, by photographing the physical environment and through access to curriculum documents.

On the first day, I arrived before lunchtime on an early summer’s day. The time of day is important when observing a school, since the work patterns of the school are
regulated by bells and timetables. Students and staff are not able to make many independent decisions about what they will do at a certain time of the day. The entrance to the college was human scale. There were no soaring rooflines, architectural embellishments and imposing edifices. The entry to the college was welcoming, functional and modest. Two things struck me as I walked from the car park: the smell and sounds of the bush that surrounded the site; and the muffled sound of activity hidden from sight. Occasionally a door would open, voices would pour out as a child emerged on an errand, the door would shut and the sounds of the classroom were cut off. The blinds of rooms were lowered or awnings screened the windows from outside eyes. From the car park you looked down on the entire site and saw small clusters of buildings and play areas, connected by paths or verandahs and dotted with small gardens. There was a strong sense of relaxed calm hanging over the site. A bell rang, sound exploded from doors that were flung open and students moved from building to building. A class came out for basketball under a covered area. Five minutes later, stillness and muffled sound descended once more.

The first sign that the educational facilities had been constructed on a needs basis as the college grew was a cluster of temporary classrooms situated on the edge of the carpark behind administration. A second look towards the main cluster of buildings confirmed the staged growth (See Figure 6). Numerous portable classrooms were located amongst permanent structures, and there was visual evidence of at least three different architectural styles, which usually indicates non-integrated building projects. The largest structure was situated at the back of the property and carried the only visual reference to the college’s identity. It was the most architecturally imposing building, with strong design elements and contemporary finishes. It turned out this was a new library complex. Signage around the college was confusing or absent, which made way-finding (navigation) difficult for an outsider once you left the front office. Later I discovered, through interviews with staff, this was in part due to the constant reassignment of general learning areas (GLAs) as the college grew and changed.
In the afternoon, I was taken on an impromptu walking tour of the facilities. My student guides were volunteers from the Head of Middle School’s Stage 3 sporTrack class. They chatted about what they understood of the Middle School structure, the smarTrack approach and key differences between the tracks. Both students had come through Junior School and remembered the introduction of the Middle School smarTrack programme. As we visited rooms used by the various smarTrack classes, they were able to point out features that were unique or at least useful to the group that used the space. For example, one student made the observation that thinkTrack classrooms were supplied with more technology than other rooms and capaTrack (the creative and performing arts strand) tried to organise more flexible spaces within their allocated classrooms. The students described the interactions and relationships between the different class and school groupings, their commentary was usually prompted by passing a particular room or space. It was like exploring a village with some local residents. Interestingly, these students did not choose to take me up to the temporary classrooms behind administration, commenting these were new rooms used by the Senior School. This area was not Middle School’s stamping ground.
The Middle School was mainly accommodated in facilities to the back of the property near the library complex. These facilities were a mix of temporary GLAs and older permanent buildings. None of these buildings had been built specifically for the new Middle School programme (see Figure 5). A few classrooms located behind the Administration block were used by the Middle School but this was only temporary. There was some student movement around the site during class time and most were individual students on an errand. There was a noticeable amount of foot traffic crossing the property, as students and staff moved between the three loosely defined areas currently assigned to the schools. Some facilities were obviously shared, and long-term locations for the Middle and Senior Schools were at this stage not fully determined.

By viewing the property in the company of two insiders, following a path they chose and listening to what they said, I gained an impression that the size of the individual school communities and the nature of student-teacher relationships were important and part of the college’s overall ethos. These students made comments that indicated they liked having their classrooms and teachers close to the playgrounds. It was convenient and gave a sense of belonging, if you could stay in the same areas all day. These views were later echoed in the student responses. By the end of the first day, I had an impression that whilst the distinctive Middle School pedagogy had been established as part of the college’s learning culture, this department of the college was struggling to exert an influence over the design and provision of physical spaces that could be used to support the particular requirements of the smarTrack classes.

The photographs pointed to specific details about the physical environment that supported the college pedagogy, and provided some evidence of the design of learning communities. In Photograph A that was taken on the terraced seating in the covered learning area (COLA) adjacent to the basketball court, personalised, collaborative and community connection patterns are evident. These patterns are typified by features such as casual eating areas (the picnic tables), gathering spaces (the terraced seating), sitting in context (view to the bushland and basketball court), way-finding (stairs and paths), distributed resources (shared playground facility) and
accessibility. This image also references some aspects of the learning-focused pattern, such as transparency, indoor/outdoor connections and signature. Photograph B, taken in the library, shows learning-focused, collaborative and adaptive/flexible patterns with the use of flexible furniture, varied configurations of space, open floor areas for groups, shelves of resources and integrated technology. These patterns emphasise features of learning community architecture, such as gathering spaces, multi-use classrooms, learning support elements such as moveable furniture, integrated technology and varied spaces.

Human scale is a key feature of the *personalised pattern* and is typified by use of size and scale in proportion to the humans using the space. Grevillea College had a domestic feeling about the scale used in the buildings (see Photographs C & D - exterior shots of Administration and classrooms adjacent to a small COLA used by the Middle School). Doors, windows and verandahs in the classroom areas were of the scale one would find in domestic dwellings. An exception to this approach was the recently constructed library complex (Photograph E that shows the approach to the library, including its ramp and stairs). The building was large, with a purple and red colour scheme and an edifice of tall rendered walls with a wide entry staircase that departed from all previous designs on site. In comparison to surrounding facilities the exterior appeared larger in its dimension and more architecturally contemporary than any of the other buildings, but as you entered the facility the architectural features returned to the human scale used throughout the college (Photograph F showing the foyer of the library’s entrance area). The interior maintained the same sense of welcoming and inclusion projected in the other learning environments.

A *learning-focused pattern* was overall evident, with some attention paid to features such as integrated technology, transparency, specialty labs and student displays. However, implementation of design features linked to this pattern was not widespread. Indoor/outdoor connections and provision of campfire spaces in classrooms were the most common examples. An indoor/outdoor connection was typified by the use of connecting verandah and walkway spaces leading into the
covered outdoor areas and playgrounds. Access between the buildings was predominately external, as shown in exterior shots - Photographs D & G. Campfire places, that is, places for learning from a presenter or expert or storyteller, were usually located at the front of classrooms near the whiteboard and furniture was arranged to highlight these spaces rather than specific aspects in the building design, such as podiums or fitted seating. This is shown in Photographs H & I that show the interior of typical classrooms. Within classrooms that did not offer the desired flexibility or specific design patterns, I observed teachers using furniture to create spaces. For example, desks were clustered to form wet areas for creative activities.

In the design of the facilities specifically used by Middle School, there were only a few examples of collaborative and adaptive patterns. Whilst the COLAs and general research section of the library did provide gathering and watering hole spaces, where informal interaction could promote social and collegial skills, as well as providing peer learning opportunities, these spaces needed to be booked prior to use and usually the entire class moved into the facility. This process eliminated the opportunity for spontaneous use of space and resources, as well as limited the use of the space by individual students or groups on a needs basis. The size of the spaces also limited the number of classes that could use them at the same time. Adaptive features in the classrooms were mainly operable walls between pairs of rooms, which were opened for scheduled activities rather than using them to create spontaneously devised spaces determined by needs as they arose throughout the day.

I found a neighbourhood configuration was the most evident model at Grevillea. This model, according to the pattern language literature, arranges classrooms around a common central open space and the classrooms are installed with a range of operable walls. Learning spaces can be expanded and linked in a range of combinations. At Grevillea College, the Middle School classrooms that gathered around one of the COLAs showed some features of the neighbourhood pattern. However, the common area was not under the same roof line as the classrooms, so use was weather dependent and limited to outdoor activities, refer to Photograph J that shows the Middle School’s COLA. The configuration was not widespread. I observed some of
the use, that was evident during my visits, of the common spaces adjacent to rooms with operable walls demonstrated the potential for creating learning community behaviours and opportunities at Grevillea. The master plan proposed by the current architects also develops the neighbourhood concept further by siting the buildings in three clusters and linking the whole site with a roadway encircling the property, and perhaps reaching the future stage where a village model would emerge when the college reaches maximum capacity of 800 students. For the Middle School, the library complex was the only example of a studio community, where clusters of flexible teaching spaces were arranged around a communal space for larger learning activities. These facilities were more self-contained than those in the neighbourhood model. However, the library complex had only three spaces for use and access was controlled by timetables and bookings. It was a shared space, rather than for exclusive use of Middle School.

In summary, the design features most evident in Grevillea College’s built environment were human-scale, indoor/outdoor connections, campfire and watering hole spaces, gathering spaces, casual eating areas, contextual connection with local community, adaptable utilities and a limited number of multi-use classrooms. The most common patterns evident throughout the educational facilities and built environment were personalised and learning-focused. Collaborative and adaptive/flexible patterns occurred in a few isolated examples such as the library complex and the covered outdoor areas (COLAs) as shown in Photographs A, B and D.
Photograph A - collaborative & gathering space, distributed resources

Photograph B - learning-focused, collaborative, flexible, integrated IT, human-scale space

Photograph C - human scale, personalised

Photograph D - Middle School COLA: collaborative, flexible, gathering space
Photograph E - exterior scale of library is less in keeping with other buildings

Photograph F - library complex interior reverts to human scale spaces, colour schemes in this building different to rest of the campus

Photograph G - indoor/outdoor access in one of the five permanent structures

Photograph H - typical Middle School core classroom, some pairs of classrooms had flexibility

Photograph I - general learning area in library, integrated IT, front of room presentation

Photograph J - gathering space for the Middle School neighbourhood, connected to two Stage 4 core classrooms and playgrounds
6.2.2. Spaces as learning environments: the Principal’s perspective

At Grevillea, the design process was led by the Principal and the Business Manager. In the early planning stages, others with expertise were drawn into the consultation period, such as the staff member responsible for marketing, the college’s building committee and the architect(s), but the Principal led the process. During the planning process, the Principal involved the teaching staff in this consultative process by talking with them about the plans, for the dual purpose of assessing the requirements of the facilities from the teachers’ perspectives and for raising a degree of positive anticipation for the new facility under construction, making the staff feel “here are the wonderful rooms we have been wanting and they would be pretty much be ready to go”. The Principal’s responses emphasised the important roles leadership and relationships played in the process of designing schools and developing effective learning environments.

The importance of relationships in building the school’s culture was emphasised by the Principal. She indicated practical issues such as financial constraints caused difficulties but were not more important than the influence of community relationships. In her view, the college was a very relational community and this had more influence on creating a learning community than the physical environment. Her concept of a great learning place was one where “the teachers love the kids and the kids respond to that. So, they will learn because of that”. That is not to say facilities were not valued or recognised for contributing to the learning environments, but the Principal took care to point out the lack of facilities was no reason why learning should not be the focus of the college. The Principal also explained the new master plan had the nurturing of relationships as the essence of the design. Buildings would be placed in a large arc across the site with the planned purpose of enclosing the community and giving it a sense of closeness within the college, although it would be a larger community by that time.
The Principal indicated teachers wanted spaces upon which they could put their imprint, and this personalisation was important to the process of forming relationships with the students. It was about making “a space that they feel they can own”. She facilitated this by allowing teachers some flexibility with the decoration and set-up of their classrooms, as well as by supporting the Heads of Schools’ decisions in relation to organisation of resources and curriculum design. All Kindergarten to Year 8 classes had core classrooms allocated to them each year. At the same time, she felt access to flexible spaces was what mattered most to students.

All staff participants, including the Principal, mentioned issues of variety and flexibility in the learning environments for reasons similar to having enough space to move. The recent introduction of the Middle School programme had placed new demands upon the physical spaces, not only in terms of access to a variety of facilities but also in the ways in which individual spaces needed to be flexible, as well as the number of classrooms that needed to be located together. The Principal said it did matter to the teachers to have “a little bit of freedom to be flexible, I think that’s really important to them, … that freedom to be their own teaching selves”.

Less frequently mentioned issues in the interviews with staff and the school leadership, but still factors that significantly influenced the relationship between learning and the physical environment, were school growth and the associated factor of financial constraints. These factors were mentioned in particular by both the Principal and the Head of School. The college, like Jacaranda, planned building projects when school growth placed pressure on the existing facilities. This growth was linked to increased student numbers and developments in the curriculum, such as the new Middle School programme. The Principal commented that financial resources were to some extent limited by the socio-economic profile of the school. That did not mean facilities would not developed but it would take longer or the designs would be more modest. School growth also had to be considered in terms of the negative impact it had upon college culture. She commented,

Sometimes we slow the growth down because we get kids coming in, who coming from other schools, do not understand our culture and if we keep on
growing too quickly we lose the culture, we lose the community and we
don’t want to do that.

The Principal emphasised the cultural architecture of the learning environment and the process by which she worked with others to provide the physical facilities. She did not speak in much detail about the architectural style and detail of the college’s physical environment. Her responses suggested that from her perspective the creation of physical environments were to some extent a means to an end, and building the college was more about creating relationships than physical structures. The design of these structures had the role of facilitating the learning relationships between the students and their teachers and the sense of community that grew out of the college culture.

6.2.3. Spaces as learning environments: the Business Manager’s perspective

The Business Manager identified a number of factors that in his view influenced the process of designing and building educational facilities. These factors were similar to those raised by the Principal. He named growth in student numbers as being the prime factor in deciding on a new building project at Grevillea; however, the adoption of the new master plan would have its own impact on future decisions, separate to the impact increased student enrolments. He also commented that temporary (demountable/portable) buildings tended to stay on the site for a lot longer than intended, thereby having an enduring impact upon the site plan. He suggested two possible reasons for this could be unexpected changes to curriculum and increased student numbers. These changes placed pressure on emergency accommodation and delays in building projects prolonged the use of the make-shift accommodation. He pointed to finances and compliance as the two major hindrances to successful building projects. Financial constraints limited what could be achieved and compliance with building regulations and government statutory authorities hampered the scope of a project, as well as the timeline for construction. Generally speaking, time delays of up to two years for building or funding approvals could mean plans would need to be modified to accommodate the new circumstances that
cropped up during those years. The Business Manager was of the view that teachers needed classrooms that worked for the purpose they had in mind, that is, the spaces had to be functional. He indicated the personal relationships that existed in classrooms mattered more to students than the physical features of the room. In his view, teachers made the space and therefore needed to be involved in the design process. He did suggest that teachers needed to visit other schools to gain some ideas for their own classrooms. However, this was something that rarely happened in reality. Overall, the Business Manager felt delays had the greatest direct impact on the process of designing educational facilities.

6.2.4. Spaces as learning environments: the teachers’ perspective

For the Middle School classroom teachers, the most important issues were related to space, by which they meant having enough room to carry out the teaching and learning activities. Four out of the six rooms used by the Middle School smarTrack core classes were in temporary portable buildings. Two of these classrooms were smaller than the others and did not have an operable wall. Therefore it was a daily issue for core teachers to work with the small floor space, limitations on furniture configurations and lack of flexibility in many of the classrooms. As one core teacher with 28 students responded when asked to describe her idea of a great place to learn;

I would need a room with more space, more room for the students so I do not need to rearrange the furniture all the time. Because my style of teaching is quite dynamic, in the morning I like a circle, I like to have the kids on the floor, sometimes I like to have a game like Silent Ball or something like that or group work, so I find if I am going to play one of those games or change the activity, I have to organise the room – you know, it is a bit of dead time. [ED - Stage 3 teacher]

Some teachers said they liked using the library classroom because it offered more space, access to technology and resources and was more comfortable than their allocated classrooms. These views were similar to that of the Head of School, who said,
The library is a very ordered environment, very well managed, well resourced and clean – I like that about it. *[Head of Middle School]*

The Head of Middle School was also a core teacher and had a substantial teaching load. Many of his responses considered the issues from a dual perspective of working daily in a classroom context as well as a leadership role. The Head of Middle School emphasised the influence of access to sufficient flexible space and Information Technology resources as factors that had significant impact upon the effectiveness of the learning environment. From his perspective, at Grevillea both space and Information Technology were in restricted quantities, thereby highlighting the issue of access to these resources. The Head of Middle School summarised the issue of space with the comment “we need free moving spaces”. He observed that the situation had been improved with the construction of the new library, which offered more variety and access to resources.

There were many references in the Head of School’s responses to the desire for versatile learning spaces that were “colourful, comfortable [with] different options with furniture” and that would provide space for a range of learning activities and approaches, with an emphasis upon the resources being readily available for use. One metaphor he used for describing an ideal Middle School classroom was that of a house, “it has lots of space and places for kids to work and it is really interesting”. This type of classroom, according to him, was not currently achievable due to constraints such as finances and schedules for replacing temporary buildings.

All staff participants mentioned issues of variety and flexibility in the learning environments for reasons similar to having enough space to move. One Stage 3 core teacher described her idea of the benefits of more flexible spaces,

> What I think would be great, if there are three Stage 3 classes, what I would like to see is three classrooms with bi-fold doors. There is more flexibility and opportunities for team-teaching or whole stage teaching or group-work, interest groups. *[P - Stage 3 teacher]*
The role relationships played in creating learning environments was another prominent theme in the teachers’ responses. The main difference between teachers’ responses and those of the educational leaders was the intensity and personal dimension of the relationships described. Whilst the Principal described how important a sense of belonging to the learning culture was and believed carefully managed relationships throughout the college played a role in building Grevillea’s learning community, the class teachers focused on the specific dynamics within their own classrooms and the relationships between themselves and their students. Teachers tended to refer to their own class dynamics and learning cultures. In response to a question asking them to name their favourite place in the college to learn and teach, most of the teachers named their own classrooms, which meant despite any limitations with the rooms they were still positive about the learning environments over which they had an influence. The other favourite place was the library classroom. The priority of having personal space for engendering a positive connection with a learning environment and therefore learning itself, was evident in many teachers’ responses.

The teachers highlighted the dimension of belonging. The teachers’ perspectives gave a sense that a feeling of belonging to a community of teachers and students underpinned a number of the Middle School teachers’ beliefs and practice. One teacher suggested a positive and effective relationship could exist between a student and their own learning, if the classroom was a place to which they belonged in a personal way. The classroom was a communal and an individual learning place. She described her concept of this learning place in the following way,

A place rich in text, technology, resources, good natural lighting, calm colours where students can demonstrate ownership of their learning through displaying of their work, responsibilities for taking care of pets, resources etcetera. (F, Stage 3 teacher).

Another teacher expressed this sense of belonging to a community and personal attachment to a space as “this is our space or classroom” (TP – Stage 3 teacher), whilst another teacher emphasised the importance of students sharing the sense of personally belonging to a communal space and expressed this view in the following...
way,
it’s not my place is our place, it’s our classroom and that they [the students] are invited to have an opportunity to make it their room as well, not what I think, so being able to make decisions about their environment and what they want to do with it, what they want to put up. (*H - Stage 3 teacher*)

This teacher concluded that the relationship a student had with the physical environment should be such that they felt empowered to have some influence and ownership over that space.

A number of teacher responses explored the importance of physical comfort in the design of effective learning spaces, which included a range of aspects such as lighting, ventilation, protection against the weather and comfortable furniture. Typical responses focused upon specific problems with a participant’s classroom, such as the room was too hot or too cold or had a leaking roof. The Head of Middle School’s comments about his experiences of physical discomfort as a class teacher were typical of the teachers’ responses,

When I came here in 2006, I was in a demountable room, probably one of the ugliest rooms in the school – there were lino floors, wasn’t painted and that sort of thing. The first year I had to work in it and it was pretty echoey and not really a good learning space. And then eventually we got them carpet and painted and now we are getting data projectors in them. The shape of them is still not great and they’re small but changes like that can make a difference and a learning space that is better [*Head of Middle School*].

The impact of physical comfort also included distractions that had a negative impact upon physical comfort, such as noise carrying from other classrooms. Teachers reported and I observed these distractions were often due to poor design features in the physical environment (for example, classroom windows overlooking distracting outdoor areas) or human behaviour in the space. Noise as a distraction was a significant concern for one teacher specialising in foreign languages, and many teachers commented on noise or visual distraction created by activities held in the COLA during class time. In these circumstances, the outdoor/indoor connection
encouraged by the design of the building also created difficulties. Some classrooms had painted over windows to control visual distractions and reduce the amount of direct sunlight coming into the room (a climate control issue). Again the issue of physical comfort emerged either when describing factors important to teachers in learning environments or when explaining frustrations experienced with inadequacies in the current facilities.

Disability access was discussed by one of the core teachers. In addition to matters of comfort for all students, the design of the college had particular problems for students with significant physical disabilities. Wheelchair access was difficult for students in a number of parts of the school with students required to take long routes or unable to negotiate some older buildings due to stairs or narrow openings. This teacher’s comments gave some idea of the difficulties faced by students wanting to be included in all the areas used by the classes. This point linked back into the larger issue of access that came through many of the teachers’ responses.

Another issue that was commonly mentioned by teacher was the provision of integrated Information Technology resources. All but one participant mentioned this issue, suggesting the unstated assumption that such resources are basic to the requirements of the 21st century learning environment. It was raised frequently in the interviews, especially by the teachers and often in relation to a lack of access in the core classroom or technical problems with the hardware. These issues were a source of frustration on a pedagogical and a practical level to teachers who wanted and needed reliable widespread access to these resources, as two examples from the core teachers indicated:

These days, I think, technology is important because automatically they [the students] get used to going to the computer to do something and they like that and I think they get stimulated through the use – when I have the data projector and lessons on the screen and interactive whiteboard in my class - I do it when I teach here (referring to the library classroom) and that is good [D - Stage 3 teacher]

and
Researcher’s question: What do you think matters the most to teachers in terms of classrooms and facilities design? Teacher response: Things that work – it’s so frustrating having technology that doesn’t work [F - Stage 3 teacher].

Two of the interviews mentioned the attributes of neighbourhood configurations and the value of site planning. These teachers saw the need for developing specific facilities and zones for all three departments that were emerging within the college. They thought some elements were present in different facilities but desired further development of the neighbourhood concept within the college. In response to a question “Is there a teaching space you would love to see changed?” two of the core teachers responded in similar ways:

I would love to see purpose built Junior School classrooms replace the demountables (A block), with wet areas, enough computers for at least six kids, more space etc. [F - Stage 3 teacher]

and

Currently, Junior School have an area and Senior School does not really have an area but more of an area than Middle School because we are still growing or newly established or somewhat newly established. We don’t really have a real Middle School space [P – Stage 3 teacher].

The same teacher (P) specifically described the constraints placed upon the Middle School curriculum as a result of the absence of permanent locations for each section of the year:

Next year there will be three Stage 3 classes. Currently I am next door to a Stage 3 teacher and the third Stage 3 teacher is a far bit away. The two of us have worked well together but next year we would like to work more with team teaching and I guess making the most of the strengths that we have in teachers or support staff or physical resources that we have. But I will be moving out of that classroom, that area because Junior School need another room … (Stage 3 classes) will be at the opposite ends of the school next year [P - Stage 3 teacher].

The annual relocation of classes and the variation in the facilities offered in each classroom (for example, some had more space than other rooms or some classrooms
shared movable walls and others did not) disrupted continuity with the delivery of the smarTrack programme and teachers’ collaborative practices.

6.2.5. Spaces as learning environments: the students’ perspective

The students were given the opportunity to express their perspectives through the questionnaire activity called “Great Places for Learning”, as already explained in Chapter 4. The students’ responses revolved around notions of what makes a great place for learning in this school. A difference in the responses given by boys and girls was only evident in a few of the questionnaire items, and these responses represented less than one third of the students in each instance. Therefore, whilst gender seemed to be a factor in a few instances, it was not a significant factor overall.

Outdoor places, such as the terraced seating and the covered basketball court (as shown in Photograph A), were chosen by one third of the students as being preferred places for learning. A similar number of responses nominated the same area as the preferred place for relaxing with friends, whilst over half of the students chose that area as the preferred place for playing during breaks. A majority of the students chose the library (see Photographs B & I), with its range of resources and spaces, as the preferred place to work in groups. Generally, areas offering the use of computers were consistently preferred choices for work. This finding suggests students considered Information Technology as an integral part of their school day. An individual’s classroom or the library’s lounging area were seen as the most preferred places for talking quietly with a teacher about work.

When combined with the frequency of references to distractions that negatively affected personal comfort and students’ ability to focus, it emerged from the students’ perspective that personal comfort was a significant factor in generating classroom conditions that make it difficult for students to learn. Factors like uncomfortable furniture, climate control and overcrowding were identified as making it difficult to learn in the classroom. Typical student responses were:
I find it hard to work when (usually boys) at the table are being naughty & they distract me. [S2]

and

The students make a lot of noise which distracts me, and my teacher because she also keep on talking. [8F]

Other frequently mentioned factors which made classrooms difficult places in which to learn, were not having sufficient space to do your work or complete activities and designated spaces for formal and informal activities. Students liked the size and variety of spaces the library had to offer, as well as the reduction in distractions as compared to the classrooms and they liked the comfort of air-conditioning. Students often linked the two factors of physical comfort and sufficient space to work. For example, being overcrowded was both a feeling of discomfort and an issue of having enough space to spread out your resources and papers.

The themes of relationships and belonging were raised by students. The students conveyed a particular attachment to their own designated desks and work areas, whilst still valuing access to communal classroom resources and college facilities, such as the basketball court. Students wrote many comments in the questionnaire that indicated relationships between students, students and their classroom, students and their own learning were significant to them. A number of the responses emphasized the importance of familiarity with a learning space especially favourite work spaces. In response to being asked which part of his regular classroom one boy liked to use, he replied:

The back of the classroom. It feels comfortable and like home ... My idea of a great place for learning is a room that feels like home and has everything a classroom needs [1M].

Another girl commented on why her classroom was her choice of a place to work:

because it feels homey in the room - because its my classroom [7F]

and other girls agreed with this view:

Because I’m used to the surroundings & seating arrangements, I also enjoy computer [6F].
and because I’m used to it [5F].

Some students drew or described their own idea of a great place to learn. The place did not need to exist, in Grevillea or in any other school. Some students explained their ideal places in the following way:

My idea of a great place to learn is a room with computers and a smart board and soccer/sports field out the back [Student 3M]; and

My idea of a great place to learn is nice, calm, quiet, interesting and small [Student 8F].

![Figure 7](image)

One student wrote, “My idea of a great place to learn: outside in the fresh air” [Student 2S] and drew a picture (see Figure 3) that showed a learning space, that despite the outdoor setting, still contained a board and individual tables and chairs in a row.

These individual conceptions of ideal places for learning echoed the factors that had already been mentioned in the student responses. Factors of access to Information Technology, playing areas, quietness, fresh air and the ambience of calm open spaces were captured in the open responses. Overall, the student perspective focused upon the impact space, relationships and physical comfort had upon their enjoyment of
their learning spaces and opportunity to learn. All three factors were also interrelated in a complex way due to issues of access and distribution of resources.

6.3. Discussion

Teacher interviews mentioned space and storage and relationships (especially in terms of belonging, personal attachment to space, and community relationships issues in the classroom). The single most frequently mentioned issue in the teacher interviews was access, and in particular, distribution of integrated Information Technology resources. Physical comfort, flexibility and variety in spaces were less frequently mentioned but were highlighted as being crucial to the learning environment. All of these were reported as being influential factors when it came to creating effective places for learning. Students rated physical comfort higher than the teachers. Both students and their teachers agreed space and aspects of belonging to a space and a class were significant factors for them. Students most frequently mentioned factors that had an influence on the relationship between the physical environment and learning were physical comfort, access and inclusion. Having enough space to move away from distractions and having choices in the places where you work were also underlying factors.

Differences in the emphasis placed on factors by classroom teachers and educational leadership were evident. Perspectives on the relationship between the built environment and learning culture tended to focus on the provision of resources that enabled the classroom teacher to teach, which included the construction of educational facilities. The Principal and Head of Middle School identified their roles in the process of providing facilities, while teachers tended to discuss the impact current facilities or the lack of facilities have on their daily work and their students. Whilst not frequently mentioned, leadership was a significant factor that had an impact on the built and learning environments according to the staff interviews. Leadership, both formal and informal, was seen as crucial to the design process and provision of facilities. Some teachers conveyed a feeling that it was their
responsibility to make things happen inside the classroom, regardless of the college infrastructure, formal leadership structure and physical facilities.

One significant difference between the student and teacher perspectives was the number of factors that influence the creation of “great places” for learning. Students focused on fewer factors, emphasizing features related to physical comfort, space and personal belonging. Teachers emphasised information technology, a sense of personal belonging as well as belonging to a community, flexibility and space. I would argue these differences related to the role each participant played in the learning relationship. The most significant difference between the teachers, learners and executives was the emphasis leadership placed upon the practical factors involved in providing educational facilities and community relationships as being key to the college learning culture. All participants shared an acknowledgement that information technology, physical space, personal space, belonging and physical comfort are significant factors in shaping the relationship between school design, the learning environment and learning communities in new schools.

However, it became clear the participants did not share a common language for discussing their use of the learning environment. I realised one group of participants (the architect, Principal, Board) were the makers, another the managers (Head of Middle School, College Manager) and the third (teachers and students) were users or even consumers of the spaces made for learning. One possible explanation for this finding is the absence of a shared and widely used language for discussing the collaborative work of creating learning cultures and learning environments. It was as if three different dialects were used to describe the process of constructing learning environments, as well as ways of expressing perspectives. These perspectives were based on a sense of priority and immediate relationship to the process. Administration and leaders spoke in terms of project management, architects speak design patterns and concepts, whilst teachers and learners spoke of opportunities the physical spaces afforded them.
The college displayed elements of collaborative and transformative leadership, as well as dispersed leadership that encouraged teachers to assume informal leadership within their classrooms and the college community. Leadership literature, as already discussed in detail in Chapter 3, has established a strong link between the nature of leadership and a school’s learning culture. The relationship between the learning environments and learning culture was based on shared expectations and responsibilities, as well as an invitation to use informal leadership to adapt the learning spaces. The practicalities of financing and building over many years influenced the design of facilities and style of leadership. Since so many decisions involved in a building project can only be made by those in formal leadership roles, it is easy for other stakeholders to fade out of the decision making process and therefore, miss the opportunity of influencing the creation of learning environments. Adapting and modifying buildings after occupancy becomes the response of these stakeholders, and in particular, students and teachers.

Perspectives on the role leadership played in the design process were intense rather than numerous. Based on the frequency of comments, leadership did not emerge as a prominent overall factor influencing school design, according to the participants. Reasons for this are not clear. Possibly the participants assumed leadership automatically commanded a role in creating learning environments and cultures was a given or this role was the exclusive responsibility of formal leadership. Class teachers may not have seen themselves as leaders in the context of the questions.

This study certainly identified the presence of key characteristics usually attributed to learning communities within the college’s Middle School. The concept of school-based community of learners rather than a learning community emerged consistently in the data. The Middle School was the strongest example of a learning community culture in the college, despite articulated intentions for encouraging a learning community pedagogy throughout the entire school culture. The built environment was not yet a determining factor in the creation of learning culture, but it did have an impact (both positive and negative) upon the learning environment nonetheless.
The college documents and website all suggested a curriculum that emphasized characteristics, as described in Chapter 3, that are typical of learning communities. In particular, the Middle School handbook emphasised a breadth of characteristics associated with learning community and collaborative learning approaches. The college website highlighted characteristics like inclusive, supportive structures, innovation, size and shared vision. From the documents, I arrived at a list of eighteen learning community characteristics (see Appendix 5) that related to collaborative, flexible learning experiences and the creation of small communities of learners, who worked with a sense of mutual benefit and shared vision. These have been identified in the literature as characterising a learning community.

It was evident the Middle School teachers were adopting a learning community pedagogy well before they had the physical resources usually associated with this type of approach. One phrase the Head of School repeatedly used was “being entrepreneurial”, meaning staff had to look for opportunities to make the most of their situations, work with others and the available resources. This notion linked into the concept of relationships that ran through the data. It seemed the creation of a sense of belonging and community was more dependent upon the quality of human relationships than the quality of the physical environment. The college emphasised people as being integral to the core business of learning and creating communities.

From the Principal’s perspective, leadership that was shared amongst a team was important for creating a feeling of community. She believed an autocratic teacher could not engender the relationship required because students and teachers needed to be willing “to interact in positive and relational ways to achieve educational outcomes”. The data indicated staff and students supported the emphasis upon building community within the school and the focus upon maintaining learning relationships that were collaborative and personal. One of the current strategies used at Grevillea for creating small communities within the college (that was planning to eventually grow to 800 students) was to create the three schools, each with its own leader, as the Principal explained;

Within the larger community there are three smaller communities where there
is a leader that builds loyalty, the kids look to that person as their leader, knowing I am the overall boss but they have someone and the teachers themselves can relate more closely to that one head of school. [Principal]

The teachers’ responses identified characteristics in the learning environment and culture that are commonly associated with learning community culture (see Appendix 3). These characteristics were: autonomy of both learners and communities; learning-focused; “I” thinks about “we” and mutual benefit. These particular characteristics were either present in the college’s facilities and learning culture or were identified from a teacher’s perspective as having an impact upon learning. All of the characteristics emphasised relationships between learners, learning and the environment, as expressed in the Head of Middle School’s response:

So, it is a mark of a good teacher that they can use whatever they have got at their disposal – I would rather have limitations on physical resources than on my inner resources - and in the end children do not learn subjects they learn people. It is the teachers that make the mark on the children rather than technology and all that sort of thing. [Head of Middle School]

The language of learning-focused and personalised patterns of design within educational facilities were the most frequently mentioned patterns in the interviews. A common view of a great place to learn, from the teacher’s perspective, was summarised by this Stage 3 teacher:

Question: What is your idea of a great place to learn? Response: Lots of space. Flexibility to move furniture and things around when the need arises. Equipment that works, good ventilation, good lighting, colour, spaces to displays things so children can feel proud of their work, functionality for the children – furniture to their size. [H - Stage 3 teacher]

This response mentions at least four key characteristics of learning communities, these being: flexibility; variety of spaces; human-scale; and student display areas. It also mentions many characteristics associated with contemporary design linked to new pedagogies. These characteristics are flexibility, functionality for students, physical comfort and student displays.
Learning community and education facility design literature has suggested the maintenance of communities of less than 150 learners is important. To achieve this goal in larger organisations, a school could break into a number of communities. Grevillea’s master plan and future planning pointed towards doing just this by establishing three schools within one college. The future problem with maintaining a small sized community in Middle School was going to be the pressure for expansion beyond 150 students and the resulting difficulties of locating this community in just one part of the college. Currently all three sections operated in overlapping areas of the college site (refer to Figure 4). The creation of three schools within the college and the Middle School smarTrack programme demonstrated organisational steps towards the notion of neighbourhoods but the development of the physical environment was not as advanced as the pedagogy. Specifically designed educational facilities for Middle School were yet to be constructed. Therefore, comments and observations were tempered by the knowledge that current allocations of physical spaces to the three schools were temporary and could change from year to year.

Documents relating to the Middle School made specific mention of the flexible use of time and space, as well as and the aim of developing facilities which that are specifically designed to facilitate creative use of space, collaborative learning and flexibility. The educational leadership indicated the decision to introduce a special, unique curriculum was influenced by a desire for the middle school to be a centre of excellence and to encourage students to gain a sense of belonging to a learning community. It was more than just a way of sectioning off groups of students. The programme was intended to focus upon the “giftings”\(^{21}\) of students and encouraged learner participation at the a time when many student disengage from structured school learning. In the forward to the 2009 Middle School Handbook, the Head observed the smarTrack Programme had developed to the point where it “has become a defining characteristic of this section of the College ... I feel that we are

\(^{21}\) “giftings”: term used in faith-based education to describe more than acquired skills and talents. A gift is a specific talent that is seen as a blessing from God to be used for the benefit of others, as well as the development of one’s own life.
edging closer to the vision that we have for our Middle School to be a ‘world-class educational community’”. While much of the Middle School documentation surrounding the smarTrack system indicated goals and aspirations that were cognizant with those of a learning community, this case study found that at this stage of the college’s development, the physical environment was lagging behind the pedagogical developments. Staff and students indicated a desire or preference for spaces that were flexible, accessible, resourced with integrated Information Technology and that were comfortable. They valued the provision of sufficient space for an activity and an environment that fostered personal and learning relationships. These types of spaces were seen by staff as being both ideal and necessary for delivering the Middle School pedagogy. However, current facilities were not sufficient for supporting all the different classes in the smarTrack programme.

It could be strongly argued that the Middle School was a learning community due to its curriculum design and structure. Where classes had access to more innovative and flexible facilities, the Middle School teachers and students could bring the physical environment more actively into the pedagogy. It was evident, however, that many of the facilities were not sufficient to drive the creation of learning community culture. Overall, it was the leadership team, staff and students that drove the learning culture through the curriculum with whatever resources were available.

This study identified the outside areas as the most successful at meeting the criteria for generating school community hubs for recreating and learning. The Covered Outdoor Learning Areas (COLAs) offered formal and informal learning places throughout the Junior and Middle Schools. Some classrooms reflected more of the criteria than other rooms but were isolated examples rather than integrated designs. Some of the effectiveness of the learning places was achieved by teachers modifying and adapting spaces with whatever resources were available. The areas that offered the most flexibility, adaptability, access and space were used intensely throughout the day, such as the library and COLAs. Possible explanations for the popularity of some spaces over others relate to the staged building programmes, the incremental growth of the school, change in the structure of the organisation and college finances. The
outside areas were more easily adapted and blended into the different building projects. Outside learning areas can be constructed at less expense than classrooms and over longer periods of time, as finances and ideas present themselves, and without excessive disruption to the college. To use an urban planning metaphor, the ultimate goal of this college was to construct three villages set within one larger town. In the future, the town will supply the more costly infrastructure and governance, as well as administration facilities and resources, with the role of maintaining a shared identity and educational goals amongst the three villages.

According to the Principal, Business Manager and Head of School, the realisation of this plan rested on 800 enrollments, finances and leadership teams willing to involve all stakeholders in the process of designing a physical environment that will support a shared learning culture. This is a conclusion with which I am inclined to agree.

Analysis of the data indicated there was a relationship between school design, the learning environment and learning communities. This relationship appeared to be chaotic, dynamic and individualised. Surfacing in the study was a sense that the stakeholders (the staff, students and educational leadership) wanted to create a learning environment that was based upon a shared learning culture, whilst at the present time regarded its creation almost as an ideal rather than a reality. The study of Grevillea College established an important perspective on the nature of the relationship that exists between design of the built learning environment, learning culture and learning communities. This relationship is problematic and fluid, but highly influential on the learning experiences of the school community. The study also revealed factors that influence the creation of “great places” for learning. The investigation of this relationship will become more comprehensive when added to the findings of the next case study of Acacia College.
Chapter Seven: Case Study on Acacia College

7.1. Introduction

In this chapter, I will report on the third and final case study in my research project. As with the other case studies, I investigated the relationship between the built environment and learning environment at Acacia College as seen from the multiple perspectives of the researcher, the students, the teachers, the educational leadership team, consulting architect and an educational consultant. This chapter also reports on the nature of the learning culture that existed at Acacia when I conducted this study and its relationship to the physical environment. I repeated the data collection activities used with the previous cases. This case study specifically involved students and staff from the Year 6 cohort. The college had introduced a middle school approach to Year 6 in the year prior to this study. The focus on Year 6 paralleled my study of Grevillea College’s Stage 3\(^2\) cohort of the Middle School. At Acacia College the aim of the new programme was to introduce a transition year for Year 6 students by increasing their access to specialist teachers and facilities, as well as focusing on independent work and research projects. I also interviewed an educational consultant and the architect, who was coincidentally employed by all three case study schools.

7.1.1. Background information

I used a number of different lenses to observe the college, and in particular, the facilities used by Year 6. I walked through the learning spaces and college grounds on a number of occasions, at times guided by a Head of School or the College Manager and at other times alone. I talked informally with staff and students about their spaces for work and learning. I listened to staff members through formal interviews and recorded visual aspects of the built environment with photographs. I talked at length with the Principal, recording his comments in field notes and a recorded interview. I read what students had to say about great places for learning in

\(^{22}\) In New South Wales (Australia), pairs of year cohorts are grouped under staged curriculum documents, for example, Years 5 and 6 comprise Stage 3.
their questionnaire responses and how the college explained itself in the curriculum documents, website and prospectus. The data was coded and analysed for common themes relating to school design, learning culture and leadership. Photographs were analysed according to criteria (See Table 1 in Chapter 4) based on identified pattern languages and principles for the design of educational facilities that appear in the current literature (Nair & Fielding, 2005; Bersagel et. al., 2007), as discussed in Chapters 2 and 4.

I also interviewed one of the senior partners in the architectural firm. I had previously interviewed him during the first study at Jacaranda College, and he had been personally involved in projects at both Acacia and Jacaranda Colleges. His firm had also consulted with Grevillea College over the new master plan for the college. Therefore, all three cases studied were by coincidence using the same architectural firm at the time of this research project. Since the firm was large, specific projects were not always handled by the same architect each time. The architect I interviewed, PS, was often involved in the initial consultation stages of design and then the project was handed onto another architect for completion of the plans and management of the firm’s ongoing involvement in the project. Therefore, this architect’s responses must be considered as being representative of the architectural firm but not necessarily those of the architect who was exclusively responsible for the designs studied.

Part of my sampling methodology was purposeful selection by following suggestions made by key participants. The Principal and College Manager both recommended I interview a person who had been significantly involved in the design for the modules used at Acacia College. This person, $J$, had been associated with a programme of establishing a series of independent schools like Acacia College since the late 1990s. $J$ had been professionally involved in education in Australia his entire career; teaching and taking leadership positions in the public system in New South Wales before moving into senior administrative and executive roles with the Department of Education and the body responsible for establishing curriculum and matriculation requirements for the state. During the 1980s, the educational consultant, $J$, had held a
senior position in the state government department responsible for designing
government school buildings and rolling out new school projects. In this role he had
stressed his desire for central locations for school libraries that acted as resource
centres for the students. When J retired, he became involved with establishing new,
independent schools, bringing all of his previous experience in the design of
educational facilities, curriculum and pedagogy to the role. Therefore, this educator
and former senior educational executive was a voice that provided a unique but
crucial perspective on understanding the relationship between learning and
environments.

For the student questionnaire activity at Acacia College, I had selected 26
photographs from 126 images taken during one of my visits. Three criteria were used
for selection: the purpose of the facility was obvious or familiar; the place was used
by Year 6 students and a range of learning spaces and design feature were
represented. When analyzing the responses from the questionnaire, I coded the
responses (see Appendix 4) according to a criteria derived from current learning
community and educational facility design literature. The purpose of these codes was
to identify emerging themes in the students’ definitions of great places for learning in
their college.

7.1.2. Context

Acacia College is a fully accredited and registered Kindergarten to Year 12 (K-12),
co-educational day college with a Prep\(^{23}\) in a metropolitan area. It is situated on a
single 24 acre site in a suburban growth area. It is a non-government, denominational
educational institution. It is governed by a Council that is appointed by, and
accountable to, the Board of the organisation that established Acacia and similar
schools during the past decade. The “Council sets the direction for the College and
monitors its progress”: the “educational leadership and management of the College is
entrusted to the Principal”, who is supported by a leadership team comprising a

\(^{23}\) Prep: Children, who turn 4 years old by 30th April, can be enrolled in one of three Prep classes.
Students would attend a maximum of three days per week during term time. Prep provides an
educational programme that leads into Kindergarten and is integrated into college life and curriculum.
Kindergarten accepts children who turn 5 years of age by 30th April.
College Manager, a Finance Manager, a Head of Junior School, a Head of Senior School and five Directors of Programs (2009 Staff Induction Booklet, pp.3-4). The school, whilst being independent, is a member of a cluster of schools that share access to a growing centralised agency that offers curriculum and administrative support to its member schools. This agency plays a role in providing financial resources for building physical facilities. The school’s work day is structured around six teaching periods. All sections of the school share the same bell times and the day ends at 2:30 pm.

The profile of the local population is a blend of long-term and new residents. The majority of new residents are settling in the recently developed estates, and according to the Principal, the college community reflects the aspirations of working class families moving into middle class lifestyles. These families have a higher standard of living, as well as access to a greater range of resources and employment opportunities than previous generations from the same area. The college’s SES24 number and the Australian Bureau of Statistics 2006 Census support these observations.

The college is surrounded by a large urban population. The local council area is undergoing substantial residential expansion supported by a complex system of motorways. The population is increasing and there are plans for a new town development, involving more than 2750 dwellings, adjacent to the college. Currently, houses come up to the college boundaries but a majority of the students travel from neighbouring suburbs. Students access the school by bus and private car, but it is possible for a small number to walk. A majority of students live within a six kilometre radius (Annual Report 2008, p.13) of the college. When the college was first established ten years ago on the current site, the location was more remote and the local area was less densely populated than it is today. The growth of the college

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24 SES: Socio-Economic Status indicator measures the socio-economic status of the parents whose children are enrolled at a school. Since 2010, the Commonwealth Government uses the number to determine levels of funding and grants each non-government school is eligible to receive.
parallels the rapid development of the local area and it is expected that the college will be able to access local community facilities in the future.

The student enrollment for 2009 totalled 1,279. Like the other case study schools, annual tuition fees were less than $5000. According to the Principal and College Manager, the college’s buildings have been erected on a needs basis as growth demands, like the other two schools. However, unlike the others, Acacia College was established with a Master Plan drawn up in 1998, and the same architects have been retained for every stage of the development. At the time of the study, the original Master Plan was undergoing review as a result of the rapid growth of the college, which was not predicted ten years ago, and as a result of substantial developments in pedagogy and technology during the past decade.

The college has an organisational structure that divides the students into two sections or departments called schools, Junior School (Prep to Year 6) and Senior School (Year 7 to Year 12). Each school has a head. The curriculum and student welfare are managed by the two Heads of School, under the leadership of the Principal. All students are accommodated on one site, called Acacia College, and share facilities such as administration buildings, carparks, auditorium, canteen, ovals and specialist teaching spaces. However, each school has separate playground areas and resource centres. The college is of a sufficient size to allow for different sections of the schools to occupy zones within the college, that is, Prep and Infants have specific buildings and play areas allocated to their exclusive use and the four Year 6 classes occupy one building adjacent to the Junior playground. These zones are indicated on the following sketch map (Figure 7).
According to its prospectus, the college promotes a strong sense of community and identity amongst its students, staff and parents. It describes the college as being “committed to providing a positive and engaging learning community in a safe and supportive environment” looking to provide “programs, activities and events which promote academic, social and spiritual development”. The prospectus also states that “the provision of a continuous curriculum across the key learning areas supports a seamless transition across the junior, middle and senior years” and specialist educational facilities “are shared across the Prep to year 12 curriculum on a single campus”. College publications and the college website repeated and reinforced these elements.

Under the leadership of its Head of School, each school is responsible for developing age appropriate pedagogy and curriculum. The curriculum complies with New South Wales Board of Studies requirements, whilst maintaining the overall learning, philosophical and educational goals of Acacia College. As the college grew, so has the structure of the organisation. Under the Heads of School are Directors of Programs. Part of the brief for three of the directors is to develop pedagogy and curriculum appropriate for junior (Prep to Year 5), middle (Year 6 to Year 9) and senior (Year 10 to Year 12) schooling. In the past few years the college began to
experiment with a more overt middle school programme with Year 6. As the prospectus says, the college is “genuinely looking forward to new opportunities and learning adventures” and is “making a priority of the middle years” by “helping our students to explore this important stage through more active, flexible and hands on approach to learning”.

The introduction of a new Year 6 programme at Acacia was lead by the Principal and Head of Junior School. The four Year 6 classes had a designated home room with the curriculum structured around a group of core studies, such as literacy, taught by the class teacher in their own home room. Students were then regrouped into mixed Mathematics groups and specialist groups for non-core activities. Students had work contracts and a six period daily structure. Students moved to other Year 6 home rooms and specialist classrooms when working in the Mathematics groups and specialist groups, where they were taught by teachers other than their class teacher. At the time of writing, there was no plan to extend the approach beyond Year 6.

In addition to the curriculum and flexible student work contracts, the design of the building that housed the Year 6 classrooms was important. According to the Principal and College Manager, when the college was first designed at the end of the 1990s under the leadership of the foundation Principal (the current Principal was his successor), part of the brief to the architects was to design individual buildings (modules) that would be self-contained and provide facilities for one hundred students. The intention was to add modules of the same design as the college grew, as well as specialist teaching spaces. The design of these modules demonstrated a response to some of the early research and thinking about using space and design as part of 21st Century pedagogy, for example, in the provision of flexible spaces, wired-in IT connectivity and a central collaborative learning space. According to comments by the Principal, the college website, my interviews with the architect, it is evident that the consulting architects were interested in using new patterns for the design of educational facilities (Nair & Fielding, 2007; Lackney, 2003). For example, patterns that introduced concepts like flexibility, adaptability and transparency into the design of learning spaces were evident in design features such
as interconnecting teaching spaces, operable walls and large windows at Acacia College (refer to Photo M, an interior shot of two of the Year 6 classrooms).

The following diagram (Figure 8) shows the configuration of a standard Acacia module or block. When taken on my first tour of the college by the College Manager, he made the point that the original design concept was based on the expectation that this type of independent school would grow in stages and the self-contained modules could avoid the problem of waiting for the construction of shared facilities, such as a library or a staff preparation area, by providing a range of different spaces within one building. Therefore, every module contained a basic range of learning spaces and facilities. The configuration of flexible spaces had also been designed with contemporary pedagogy in mind, especially the flexible access to resources and the integration of technology into the classroom spaces. The original concepts for the design of the module were investigated in detail in an interview with the educational consultant, who had been involved in the first building project at Acacia. His view on the purpose of the module design differed in terms of the type of learning pedagogy it was designed to support and the current use of the spaces at Acacia, and this aspect is discussed later in this chapter.
A number of these modules or blocks were built over the first few years. In addition to these general teaching blocks, the college constructed specialist facilities such as laboratories, kitchens, workshops, art rooms and a multi-purpose auditorium. The original idea of spreading resources throughout the college rather than gathering them into one resource/library/technology complex was maintained. Small library collections were housed in different places around the campus. Prep and Kindergarten also required slightly more specialised facilities but the architects maintained some of the flexible features, such as operable walls, outdoor covered seating and common learning spaces. As the school grew larger, the site began to divide into three informal zones (as shown on the sketch map of the site – Figure 7).

According to the Principal, the plan for Year 6 as a “middle school” was to locate the four classes in connecting rooms, so the students could re-group and collaborate throughout the day. However, college enrollments meant one of the GLAs (general learning areas) in their block was required to accommodate another primary class.
Therefore, a decision was made by the educational leadership team to turn the central learning area into one of the Year 6 classrooms. By doing so, all four classes were still connected but the large, central communal area was lost. To provide the shared resources, the resource centre (library or Independent Research Centre/IRC) supporting the Year 6 students was housed in the next building’s central learning area. A computer laboratory was also established within this resource centre. The new configuration is shown in the following diagram (Figure 9). To access specialist facilities, such as kitchens, the Year 6 students moved across the campus to the Secondary School. The Year 6 block opened out onto the large covered outdoor learning area (COLA) that also doubled as the junior playground and lunch area. Leading from this COLA were stairs that took students up to the basketball courts and ovals beyond.

Figure 10: Year 6 room allocation in the module. (Source: researcher)
7.2. Spaces as learning environments

7.2.1. Spaces as learning environments: the researcher’s perspective

On Tuesday, 19 May I arrived at 9:30 am. The college’s site is elevated, so the buildings could be seen as you drive towards it. Once you climb the stairs to the Administration Building, the site’s slope is less obvious and the buildings rise in gentle stages via a network of paths and flights of stairs up the hill. The college name, crest and motto are clearly visible to the visitor and school community on Administration’s facade and in the reception foyer. I used the main entrance but there are actually five gateways by which the students enter the property, depending upon the transport they use to get to school and the section of the college to which they belong (Photographs A, C & F). The college day had already begun and the carparks were quiet, the parent traffic had gone and only late arrivals or volunteer mothers were coming and going in small numbers in the reception area.

The reception foyer and access to the Administration Building was well sign posted, as was the rest of the property with an abundance of wayfinding signs and building labels. The foyer was furnished with a contemporary lounge, had a large reception counter (adult height) with a wood panelling screen behind the receptionist screening the office from sight. The college name, motto and crest were displayed on the screen. This foyer was for adults and visitors, whilst students had a separate reception area at the rear of this space, which was accessed by two doors from the playgrounds and the student counter was lower, as shown in Photograph B. The administration areas were well lit with plenty of natural and artificial light, understated in their formality, quiet and spacious. College activities were represented by a display of trophies in cabinets and a flat screen that showed photographs of college events.

While I was waiting, a parent brought in a late arrival student. The family knew the procedure for signing the late attendance register and did not need to interrupt the receptionist. There was a relaxed but professional ambience in this space, with careful attention paid to presentation. Overall, the impression was one of a thoughtful
integration of the daily business of the college into a built environment that was also
the main interface with the public and parents.

I was given a tour of the property by the Professional Assistant to the Principal. This
guided tour was more formal than my exploration of Grevillea where students acted
as my guides. The conversations were directed by the areas I wanted to see and
photograph. Acacia’s site is extensive and complex with a large range of facilities
and teaching spaces, for example, the large covered outdoor learning area (COLA) in
Photograph P and the outdoor grassed terrace area in Photograph E. At the time of
writing, the college still operated on a staged building programme, erecting stand
alone modules and specialist facilities such as the multi-purpose auditorium and
science laboratories (see Figure 1). Most of the buildings were single storey but those
buildings that were two storey were built into the slope, allowing for some direct
level access to the playground. Many pathways criss-crossed the property but there
were few covered walkways. I was told this was due to the expense and staged
development of the buildings. Signage and wayfinding markers were less obvious for
internal pathways than the public access points, but the public would be rarely
required to navigate themselves around the students’ sections of the property. Staff
and students seem to know where everything was on the campus, which was similar
to the other case studies. Most large communal spaces, like the auditorium, had more
direct routes from one of the many gates into the site. There was no large college
library on site. Instead, there were smaller departmental Independent Resource
Centres (IRCs) scattered around the property (interior and exterior details of the IRC
building are shown in Photographs J, H & I). After School Care and Prep were
offered in a collection of buildings to the northern corner of the property that had
direct access to the nearest gates and parking.

I observed minimal class movement during class time and there were few students
wandering around. This may have been due to the design of the modules which all
contained toilets, drinking fountains, bag storage spaces and integrated information
technology resources (all of these aspects are shown in Photographs N, O & G).
Even the Administration Building had two entrances, one for northern junior
classrooms and one for southern secondary classrooms. There seemed to be a great deal of thought in the design of student areas that ensured students did not need to move far from their main learning areas. Lunchtime presented some opportunity for students to move between shared facilities like playgrounds and the canteen or along pathways that led to the recreational spaces, however, there were still distinct areas for the different departments within the college (see Figure 1). There was a roving playground duty teacher to supervise the connecting paths and link areas between the main play areas of junior and secondary/senior school. The Infants department was quite self contained with fencing and play facilities, and therefore, I did not observe small children moving beyond their buildings.

The college buildings reflected a design that is suitable for the temperate climate of coastal New South Wales. The buildings had wide eaves that provided verandahs around building perimeters and seating outside classrooms were built along the walls. Where design allowed, for example, the building was freestanding with opening windows to waist-height and glass classroom doors, shown in Photograph D, an exterior shot of the Year 6 block. The use of natural light and fresh-air ventilation was emphasised, especially in the GLA modules. These modules provided the bulk of the GLAs at Acacia, but many of the central areas had been converted into dedicated or task specific resource areas (known as Independent Research Centres or IRC) or additional classrooms.

Pathways and systematic plantings, plus well maintained hedging and shrubs, provided key visual and pedestrian links between different parts of the college and what appeared to be different stages of development. The three different hubs of the school were linked by a north-south axis, whilst Administration and the auditorium were situated on a central east-west axis. Despite rapid and sizable growth, elements of exterior design had been maintained through the stages, for example, in the rooflines and windows and selection of wall materials. Variation appeared in the interior fit-outs. For example, specialist rooms affected interior choices as did the age of the building in relationship to the installation and integration of Information Technology resources. Student display areas in public areas were minimal as there
was little available wall space through the buildings. The auditorium was a multipurpose facility with multiple operable walls that could only be used for temporary displays. Utilisation of spaces between buildings for sitting areas and the positioning of focal points like wide stairs, soft landscaping, seating and hard landscaping suggested there was a recognition of the affordances these places offered. Both the College Manager and Principal said some decisions had been made to develop these types of areas as settings for informal learning and community activities (for example, Photographs P & E, the terrace and COLA). As an outside observer, I considered this was evidence of a leadership strategy to trigger learning experiences in “non classroom” settings. This observation was explored with the educational leadership team in later interviews.

There was evidence in the built environment that one architectural firm had been involved in the college’s design from the beginning. For example, throughout the college a sense of human scale in the buildings’ proportions had been maintained, although the college had grown from 150 to 1300 students on one large site that catered for Prep to Year 12. The college had developed a consistent architectural signature throughout the site, giving the college a cohesive appearance. Unlike Grevillea and Jacaranda Colleges, Acacia had worked to a master plan at each step of the college’s development, and according to the Principal and College Manager, by maintaining the same architects it had been possible to revise the master plan to incorporate new ideas, materials and resources. Both the Principal and architect said the college and architectural firm had built a client-designer relationship over many years, which facilitated the process of constructing the built learning environment and interpreting the needs of the college at each stage of growth.

Once I had completed a survey of the entire college, I turned my attention to the core areas used by Year 6. I had blueprints for the buildings, so I was able to compare the original plans with the current use. The Primary department’s Independent Research Centre (IRC) was currently housed in B Block and Year 6 in C Block. As shown in the following diagram (Figure 10), both of these buildings opened off the Junior playground/COLA. Behind C Block was the student entrance to this section of the
school (entrance is shown in Photograph F). Year 6 stored their belongings along the
walls and in trays in the rooms of this block (storage shown in Photograph O).

The IRC that served Year 6 occupied Central Learning Space in B Block (exterior
shot in Photograph J). A mezzanine floor had been constructed in the high ceiling
space, which provided a small computer lab for casual bookings by classes.
Downstairs the junior resources and the library collection for these students were
housed on shelving. (details shown in Photographs H & I) Student work tables were
set out in groups, leaving open floor space in between the clusters. The Principal told
me the philosophy behind these IRCs was the distribution of resources to the nearest
points of contact with students. If the college had one large library, students would
have to leave their sections of the college to use these resources. The college wanted
to foster a pedagogy that placed resources within the classrooms or adjacent areas, so
research could be conducted spontaneously and continuously from the classroom. In
recent months, the college had reviewed this approach to providing library and
computer resources and has decided to continue with the IRC model.

Figure 11: The Junior School (source: researcher)
The Year 6 students were accommodated in one of the original modules, as already explained. Photographs K, M, N and O demonstrate some of the key features (operable walls, student display areas, clusters of work desks, integrated information technology resources, flexible furniture configurations, indoor/outdoor connection, natural light and ventilation, human scale and personalised storage) of these learning spaces and specifically design elements that current literature links to learning community pedagogy (Nair & Fielding, 2007; Taylor, 2000 & 2009). In conversation with the Principal, he told me he kept abreast of the most current writings on contemporary pedagogy and educational facilities design. He said the arrangement of Year 6’s module was a move towards implementing some of the ideas and practices of middle schooling. Provision of specialist facilities, such as science labs, was achieved by timetabling existing Secondary facilities for use by Year 6. The Principal talked about creating flexible and adaptable learning spaces, with as many opportunities for independent and collaborative work between students. He also told me about the decision to continue with the IRC model and his own interest in developing informal outdoor spaces that encouraged learning. The junior COLA and amphitheatre area were examples of this type of thinking (Photograph P). Above the COLA were the hard courts and ovals, thus supplying easy access for lunchtime recreational activity (this access is shown in Photograph Q).

The Year 6 classrooms reflected myriad activities that were currently taking place within the curriculum at the time of my visit. All available wall space was used for displays of student work, desks were arranged in clusters and an operable wall quickly doubled the size of a collaborative work space for teaching sessions such as Maths groups (see interior details of the Year 6 rooms in Photographs K, M & L). The fact that each classroom opened into the next allowed for quick arrangement of the mixed Year 6 groups. The timetables for each core Year 6 class reflected the variety of learning experiences (for example, independent contract work, use of the Food Technology and Visual Arts rooms) and use of different learning spaces throughout the week. Collaborative learning, as well as independent research and contracts, were emphasised in both the teaching programmes and the arrangement of the physical learning spaces. The opportunity for introducing more sophisticated
forms of integrated technology into the Year 6 programme was created by access to the secondary specialist rooms. When observing the Year 6 classes for a morning, the flexibility and movement of students between teachers and spaces was evident. The module was busy with a level of noise that would be expected when students were working in this way. In addition to the overall timetable, the students’ individual learning plans gave direction to the activities and students did not need to refer to their teacher for continuous instructions. Therefore, from my observations the new programme was combining pedagogy and physical learning spaces to achieve the planned learning culture for Year 6.

The photographic data revealed some use of neighbourhood\textsuperscript{25} and village\textsuperscript{26} configurations in the overall layout of the site and the preference for the module design. The modules encouraged spaces where students could work in small communities of one hundred but college growth had overtaken the design of these small neighbourhoods. This growth was leading the college more towards a village configuration, with a number of cohort defined neighbourhoods arranged around common areas, such as the amphitheatre for the Junior section (see Figures 1 & 4). In later conversation with the Principal, I was informed there were new discussions with the architects to devise a master plan that would unify shared areas and neighbourhoods along a circulation spine, that is, a pathway or avenue that linked the different areas, somewhat like a main road.

\textsuperscript{25} Neighbourhoods - central open space used in common by the classrooms surrounding this space. Rooms installed with a range of operable walls. Learning spaces can be expanded and linked in a range of combinations.

\textsuperscript{26} Villages – A number of neighbourhoods are arranged along or around a larger common area used by the neighbouring classroom clusters. This circulation spine/zone can be used individually by each neighbourhood or for an all-school activity.
Photo A: Access from carpark and one of the student gates. Double storey building embedded into slope. Example of signage and wayfinding paths/railings. Signature colours.

Photo B: Student reception is personalised for purpose and human scale. Accessed from playground.

Photo C: Exterior view of gardens, paths and roof-lines. Signature style, wayfinding and ambience integrates buildings.

Photo D: Example of verandah outside classrooms. Shows natural light and ventilation. Provides weather protection for indoor/outdoor connections.

Photo E: Example of utilisation of space between buildings for outdoor learning and informal gatherings. Natural amphitheatre for presentations.
Photo F: Junior school gate from carpark. Shows low roof-lines that give shade and extend into verandahs for each module. Personalised access and signage evident.

Photo G: Year 6 block showing personalised aspects of design (student toilets, drinking taps, space for informal gatherings, student storage, natural light and ventilation for classrooms, indoor/ outdoor access.

Photo H: Interior of students’ work area of IRC - shows collaborative work desks, presentation space, resources for independent research and connection with outdoors.

Photo I: Computer lab in Junior School IRC (example of distributed resourcing).

Photo J: Junior Independent Research Centre (IRC) - distributed resources, collaborative learning focus, centrally located on playground.
Photo K: Central resource area is now used as a Yr 6 core classroom.

Photo L: Collaborative workspace within one of the Yr 6 classrooms. Shows fitted storage, wet area, resources and student displays.

Photo M: Operable wall is open between two of the Yr 6 classrooms. Shows flexibility of design being used, collaborative furniture configurations, student display opportunities maintained and shared by larger group.
Photo N: Integrated Information Technology - access to resources within a core Yr 6 classroom. Note glass windows covered up now central space is a core classroom.

Photo O: Personalised student storage in the core classroom. Human scale. Preparation bench on the top.

Photo P: Junior Covered Outdoor Learning Area (COLA) in the playground. Provides an amphitheatre, outdoor learning space and informal gathering area for students.

Photo Q: Hard courts provide recreational area and sporting facilities. Looking towards the COLA.
7.2.2. Spaces as learning environments: the architect’s perspective

The architect’s responses focused upon the general principles of designing new buildings rather than the details of each building project. He did comment that Acacia College’s administration building was a very successful project because it had been situated according to the Master Plan, had a sufficient budget to realize its full design and the location of the building made it a hub at the centre of the college. In his view, strategic planning and sufficient finances had been key factors in creating this effective facility.

The architect emphasized how important it is for a school to know its own business, goals, growth patterns and maximum capacity before constructing the physical environment. Without knowledge of how the school’s business would grow and function over time, a school would find it difficult to build facilities that were going to be suitable for this business. In his experience, schools sometimes came to the architect with a solution rather than the problem. The architect believed that it was the responsibility of the architect to design a facility that was going to add to the client school’s business and solve a problem for them, and this was a professional tenet of this particular firm. As an architect, he wanted to deliver a client’s own mission and goals as articulated by the project brief prepared by that client through the building. Therefore the school needed current strategic and business plans, a master plan for the site and the resources required to deliver the core business as defined by those plans. The architect was clear about the client role for schools. He said it was no different from any other designer-client business relationship.

According to the architect, there was a definite relationship between leadership and educational facilities, starting with the college leadership that is responsible for building projects. These leaders articulate the school vision and act as “gatekeepers” during the entire process. The architect was referring to the Principal and college/business manager, and he believed these leaders’ personal and professional experiences influenced their attitudes to changing school designs. He commented
that in his experience schools rarely emphasised school learning culture and
community creation in their design briefs. Usually the briefs articulated what is
needed in terms of structures, specific physical requirements, preferences and the
function of the facility. Whilst a building might be able to promote a learning culture,
the architect was definite that a building could not stand in the place of a learning
culture generated by the school itself.

In response to a question about what mattered to teachers in terms of facilities and
classroom design, the architect responded that what mattered most was teachers
having enough space to do whatever they set out to do. However, how big that space
is and what a teacher wants to do in that space is influenced by the teacher’s own
experience of using spaces. Features such as natural light, ventilation and comfort
also mattered. From an architect’s point of view, flexibility and adaptability were
important aspects of a school facility, but only if there was a purpose for having these
features in the design.

7.2.3. Spaces as learning environments: the Principal’s perspective

The Principal argued that the key factors with the most significant impact on design
were those of leadership and the collaborative nature of the design process. He
described all the stakeholders that had to be included in the initial discussions when a
building project was proposed. In one conversation he said:

   Successes are when you get agreement from the key group of
   stakeholders. Successes come therefore, when the vision is owned, the
   vision for this particular facility is owned by all of the stakeholders.

It was also his opinion that the number of stakeholders involved made the process “a
bit cluttered”. The process involved much liaison work directed by the Principal. The
Principal argued that a successful building project occurred when the vision is owned
by all stakeholders beforehand and therefore the building was the result of “the right
group of people owning the right vision, and then leadership says let them do what
they are best at doing”. For reasons not explained, parents and students were not part
of the process.
According to the Principal, leadership was at the heart of encouraging staff to use the facilities to support their teaching practices. The Principal conveyed the belief that it was his role to constantly find ways of explaining the broader role of the teacher in the process of using spaces to support learning. He stated it was no different than approaching curriculum design and all the staff had shared responsibilities in the process. In this interview and many other conversations, it emerged that leading change through collaboration was the essence of this Principal’s leadership. The Principal was constantly “trying to get individuals to think outside of their immediate context … that they might have a look at a building in a flexible way – how can I use this for other purposes”. He encouraged staff “to not be limited by space and time”, which meant going beyond what simply happened in the physical environment to consider areas of curriculum, welfare and educational philosophy. It was reasonable to conclude this Principal was also realistic about the types of compromises that need to occur and complexities that will arise when working through a collaborative design process. However, he argued these compromises and complexities can be mitigated by having “a bit of experience, with a bit of expertise … never be afraid to call in the right people, you will come up with a compromise you can work with”.

School enrolment growth was closely linked to the development of educational facilities at Acacia. As the Principal stated, “in this sector of schooling it’s all about enrolment growth as opposed to the added extras in the curriculum”. If a new project did not allow for increased enrolments, it could not generate increased income for the college which was a priority in the first years of establishing a new school. This view was also endorsed by the educational consultant I interviewed. Hence, financial constraints and changes in population had an impact upon the design of the school buildings.

Other factors that had an impact on building design were the unanticipated external changes that had an impact on the college’s decision making processes. Whilst enrolment growth could be anticipated, other change agendas could not. For example, at the time of researching Acacia, the Australian Federal government was
rolling out substantial but extraordinary funding projects. The funding was part of the Australian government’s response to a global economic crisis and was directed at stimulating the national economy. As a result of this, Acacia was managing a sudden injection of funds for Information Technology resources and the construction a specific range of educational facilities. Problems with the funding included the limitations placed upon the how and when it could be spent:

So, by and large it will work but what we know is that it is thrust upon us … it will be a very quick process and it is likely there will be a lot of compromises made in that. (Principal)

The Principal’s solution to imposed change was to ensure the college educational vision was in place and that he had a range of experienced people with whom he could collaborate to design the project within a short timeframe and according to the master plan.

When asked about his favourite place for learning in the older years, the Principal said,

it’s the USB that we gave the kids … because it opened up the doors for allowing kids to break out of the desk and chair and it said we were prepared to let the constraints go. (Principal)

This response demonstrated the way the Principal promoted practice that embraced innovation and new ways of approaching learning. The Year 6 programme was another example of the way the Principal led innovative change. He said he had recognized that the physical resources were available in the existing facilities and that according to current research on middle schooling, the cohort was suited to a programme that focused on the transition from primary to secondary schooling. The Principal had seen an opportunity to innovate based upon a professional belief that pedagogy and physical space have a relationship.

7.2.4. Spaces as learning environments: the College Manager’s perspective

The manager’s responses in his interview revolved around two main themes: leadership and college growth. The manager considered the process of building
facilities a team effort, with individuals fulfilling shared and individual responsibilities. The manager described the process in the following way: it began with formal leadership from the Principal and the vision he had for the facility. The Principal then expressed these visions to the manager, who did the first translation into concept sketches and notes,

He [the Principal] usually has the vision for our master plan and he expresses those visions and ideas with me, and we sit down and put pencil to paper and start sketching and he basically instigates that with a vision and we work together to make it a building. (*College Manager*)

Once they had an idea on paper, other staff were brought into the team, as well as the architectural firm. The team changed as the project continued, and the manager assumed a more central leadership role once building construction began. This was the expertise this member of staff brought to the process. The manager described his role as the go-between for the architects and the teachers. From his previous experience of commercial construction, the manager said an architect working for a commercial organisation would decide what would be needed according to their knowledge of design but, in a school context, the manager argued a more collaborative approach was needed in order to bring about a more successful and effective design for educational facilities.

The manager also focused on the practical issues associated with college growth. He emphasized the need for adaptable designs and cited the example of a project that was finally going ahead after five years. In that time college needs had changed, so the manager had formed a team comprising coordinators, the Principal and himself to redesign the internal layout. This team sat down with the plans and discussed the various options for a redesign. As an independent business and like the other case study schools, Acacia college had the autonomy to follow this process of redesign. The manager also highlighted the practical considerations involved in managing staged projects, such as tight deadlines, contracts and supply of materials, to ensure facilities were ready for occupation at the beginning of a year to accommodate the increased enrolments.
7.2.5. Spaces as learning environments: the Head of Junior School’s perspective

The focus of the Head of Junior School’s responses was on factors and issues relating to curriculum, physical features and details of classroom design, flexibility and space. This was to be expected given her leadership role within the college, since this staff member was responsible for the day to day leadership of the Junior School and dealt directly with the classroom context. She emphasised the importance, in her view, of students and staff feeling that they belonged to their classrooms. The Head of School was involved in the collaborative design process on behalf of the Junior School staff and students. Although her role was not so senior as to be able to change plans, she had been pleased with the results of staff input into recent building projects.

The Head of School returned often to the theme of curriculum and pedagogy and its link to the physical facilities in a classroom. She emphasized a number of design features that have, in her experience, a direct impact upon the delivery of teaching programmes. Prominent amongst the features mentioned were the amount of storage and floor space available for use within a classroom; movable walls for introducing variety into the configuration of spaces; a range of spaces for different modes of learning and delivery; and Information Technology resources. She identified space as a factor that affected the effectiveness of a learning environment, and thought it was the single most important factor for teachers. She expressed the notion in the following way; “space to be able to set your room differently”. Without space to reconfigure a room, students could be locked into reduced range of learning experiences.

A classroom ambience that made students feel secure and able to take risks was a factor that she felt mattered the most to students. She also said creating a sense of belonging to the space through personal and communal ownership was important. In her opinion, a good classroom was one where students can “feel free to take risks and have a go” and “students can feel safe, secure and comfortable”. She talked about the relationship between the student and their own learning and the role a physical space,
as well as an enquiry-based pedagogy plays in mediating that relationship. The Head of School said:

You are giving the children a chance to go further than you had planned to take them because you are willing to investigate with them and let them go.... I think having a warm not austere classroom ... having something that is alive and having things happening in it, lots of things around the room ... it is really important that that they [the students] own the space and they comfortable.

She said effective learning environments were flexible classrooms equipped with various learning spaces and sufficient space to reconfigure activity areas. Having some control over the space was important for both students and teachers. In summarizing how she viewed the relationship between the students and their learning space she emphasised how important it was for students to “own the space”, to feel comfortable and to “know that they don’t have to sit in this box all the time”.

The Head of School also raised the role of leadership in encouraging teachers to use the potential already present in their physical learning environments. She indicated learning communities needed to be a whole school culture, driven by “your movers” and involving modeling, mentoring and collaboration. The process of maintaining such a culture was achieved by formal and informal strategies.

7.2.6. Spaces as learning environments: the teachers’ perspective

I had planned to investigate the relationship between learning and the physical learning environment with some of the Year 6 teachers. As already discussed in Chapter 4, only one staff member returned a response to the email interview questions. The teacher who replied was a specialist Technology teacher, therefore experienced in teaching in flexible practical rooms. Her responses emphasized the role of good lighting, space to vary delivery modes, storage and access to Information Technology resources. She also highlighted the role classroom management played in creating an atmosphere of learning in a classroom. Like the Head of School, this teacher indicated some feeling of belonging to their learning space was important to students, as was physical comfort. She said a sense of
belonging could be achieved by regular access to the same room and acknowledgement of students' efforts by displaying their work in their classrooms.

7.2.6. Spaces as learning environments: the educational consultant’s perspective

The educational consultant’s perspective was a product of his experiences of the relationship between the built environment and learning environments from all angles, as a classroom teacher, as a Principal, as a member of an organisation enabling the establishment of new schools, as a senior bureaucrat and as an educational policy maker. His vision for pedagogy and the design of the spaces required by this pedagogy was instrumental in determining the designs the architects developed for Acacia.

A number of key points emerged during the two hours of conversation and interview. Firstly, J made the point that an educational philosophy, whether it is acknowledged or not, underpins everything that happens in a school and influences decisions. In reference to Acacia College’s modules, J called the philosophy that drove the design “flexible progression”, whereby students would be able to follow flexible, multiple pathways to achieving the identified key learning outcomes rather than one predetermined, lock-step teaching programme. All resources, facilities and curriculum need to be built around this concept. He explained, “I became convinced that what I will call traditional classroom teaching is often a most ineffective way of bringing about learning in students”. Therefore, the design of learning environments should facilitate flexibility not limit it. He believed a student’s progression through learning should not be linked to age or cohorts or time but determined by the achievement of outcomes.

The consultant identified the most influential factors in designing and building schools as: community perceptions and teacher perceptions of education and facilities; finances; and leadership by the Principal. Whilst educational philosophy could be another factor, J indicated that in practice it did not play as significant a role as it should. This interview raised perspectives similar to those raised in the
educational leaders’ interviews. J identified the Principal as the key leader, who represented leadership both formally and informally in a school. This leader was the most influential in all aspects of the school and could create “tremendous subtle differences”. J indicated distributed leadership could not get schools designed and built, and whilst participants and stakeholders need to be included in the process, the Principal was the key decision maker, authority and responsible party. Finances had an impact on what could be achieved in the design of facilities. This participant could speak with authority on this aspect due to his professional experience of building state funded schools and then independently financed colleges, such as Acacia. He said that during the first five years of establishment, a school’s finances were tight. If the school survived, their ability to generate income improved. Therefore, schools like Acacia would have no other choice than to build in small staged projects. J estimated it would currently cost $30-35 million to build a complete school for 900 students in one project. Alternately, the modules allowed for growth in 12 month cycles at the rate of 100 students per year, thus making it possible to take small bites at school growth and facilities construction.

The consultant identified two factors that had a substantially negative impact on the process of creating learning cultures. The first of these were the impact of expectations placed upon schooling and schools by the community and parents and the second was the force of conservatism which emphasises “safer” traditional concepts of schooling. In his experience, entrenched resistance to change was enormous in New South Wales education and dominated plans for establishing new ways of delivering education. Associated with this resistance to change was teacher attitude to change. J recognised teachers could control how learning spaces are used. He suggested that features in the design that were capable of prompting action from the students may not be sufficiently defined or obvious to direct new ways of using space as pedagogy. Equally, the physical environment might be ignored or its influence negated by modifying space to more closely resemble conservative “egg crate” classroom designs.
For Acacia, J had envisaged a design for an educational facility that could provide self-contained facilities for 100 day students and their teachers at a cost that all new independent schools could afford. The design would provide four large teaching spaces that surrounded a central resource centre. The design had a two-fold purpose: to facilitate incremental growth within a new school; and to support a pedagogy based upon a philosophy of flexible progression for all students. J was quite clear that learning communities did not feature in his considerations of this design, which is more than likely since he had been thinking about this design before learning community theory was applied to the school context. However, many of the design principles are similar to those in learning community architecture, thus making the design relevant for its current uses. It is significant that the cues provided in the module architecture did not determine the adoption of the flexible progression model at Acacia, which may indicate architectural elements have power of suggestion rather than determination. At Acacia, the flexible elements were recognised but used to support other forms of collaborative learning favoured by middle schooling approaches. J’s vision for the design of these modules was clear enough to ensure architects translated them into buildings that could support a flexible progression pedagogy, but since he was not a leader in the school, he could not direct the establishment of that particular learning culture. J actually made the observation that this was actually not unexpected:

I had learnt that just because you might provide for some good facilities, facilities which enabled things to happen, they would not necessarily happen. It needed inspiration for Principals and teachers to make it happen.

And although these designs provided key elements that would support flexible learning styles, such as the shared resource centres, the buildings did not capture his concept for facilities in its entirety, as he revealed in the comment:

Now looking back on it, I acknowledge that in some ways I had to compromise my own vision by continuing with classrooms. If I was building a school completely to my own vision, I would not have classrooms but a range of teaching spaces of all sorts of sizes.
The theme of compromise between what is hoped for and what is achieved has been raised in other participants’ responses. The source of the compromise lies in a variety of places, and in this case, it lay somewhere in the interaction between the advice of the educational consultant, the proposed design that was translating concepts into working plans and the educational leadership provided by the Principal and teachers, who would ultimately use these spaces with students.

7.2.7. Spaces as learning environments: the students’ perspective

The student responses to the questionnaire suggest access to technology was a key component of a favourite space for learning. One half of the student participants said the banks of computers were their favourite part of their classroom, and one third of the sample named the Independent Research Centre (IRC), which included an integrated computer space, as the best place for learning in the college. The IRC was also the preferred place for working on group activities during lunchtime for almost one half of the students. Reasons given for naming the computer areas as their favourite learning places were: fun, faster than writing, modern, easy to use, playing games, like to use them and for completing research and contracts (See Appendix 7).

Comfort in the classroom was the most common issue that affected students’ view of an effective learning space. Comfort was also linked to eliminating negative factors that were present in the students’ classrooms. Some responses singled out aspects such as lighting, but by far the greatest concern was the issue of distractions. Distractions ranged from the behaviour of other students to “teacher talk” carrying from another part of the room to obstructed views of the whiteboards to displays mounted around the classroom. Distractions generated by other people were identified as factors that make it difficult to learn in almost half of the returns. Whilst these distractions are not immediately evident in the photographs, they can be explained by the arrangement of the physical spaces and design features such as the height of ceilings, floor space per students, lines of sight and furniture configurations. According to the students, setting up classrooms for maximum interaction also created environments that generated distractions, therefore they
wanted some control over their own spaces and especially options for quiet places for individual work.

Space and control over the space were key factors for the students when creating great learning environments. A substantial number of students expressed a preference for working on independent and group tasks in open flexible spaces such as the auditorium and Independent Research Centre. Students gave reasons such as quietness, fresh air, peacefulness and size. The Year 6 classrooms were rarely selected as favourite spaces to work, although a number of students identified positively with individual aspects of the rooms, such as their own desk and chair. The areas of the classroom students did not like to use when completing learning activities were their personal tote (storage) trays, desk areas and the cupboards. The most common reason given was the mess and disorder caused by a lack of storage in the Year 6 classrooms.

Students were invited to describe or draw their idea of a great place to learn. The place did not need to exist. The following drawings and comments show the range of ideas students expressed:

My idea of a great place to learn is: I would like a room with pillows for [thinking] reading etc. but it has to be quiet. [student 2S]

My idea of a great place to learn is: I would like a very bright and [vibrant] place for learning [somewhere] it is enjoyable to be. [student F1]

My idea of a great place to learn is: A place with no distractions and is quiet. A place where only friends can come in to. [student F6]

My idea of a great place to learn is: there will be a big room with desks and pencils in the middle - a huge whiteboard and some bookshelf around the classroom and pretty paintings all over the walls. [student F7]
In these more open responses to expressing their notion of a great place to learn, students raised a number of themes. A workplace that is their own, access to a range of resources in a large room or specialist facilities, a learning space that considered ambience and physical comfort and places that were free from distractions. Responses also indicated students wanted places that included friendship and that were enjoyable to use.
The students’ responses identified a number of factors that influenced the relationship between the built environment and learning. The most frequently mentioned factors were the presence of distractions, access to Information Technology (especially resources integrated into their classrooms) and the provision of active, outdoor areas. Commonly mentioned negative factors were issues relating to space, storage and physical comfort. There was no gender difference for any of these factors.

7.3. Discussion

From the perspective of the leadership team, four factors were seen as either having an impact on the relationship between learning and school design. These factors were: flexibility while still following the master plan; collaborative relationships; leadership and school growth. When asked to consider the most important features of learning environments, these participants highlighted features such as storage, collaborative work spaces and transition between spaces. Other key characteristics of effective learning environments were flexibility and variety in spaces. A significant factor that had an impact on design was the issue of compromise. Compromise due to time, financial or planning constraints had a real impact on the type of facility that could be built. Balancing competing demands and a degree of disjunction between teachers’ classroom practice and the types of pedagogy the design anticipated also created compromises that had to be managed.

The Principal raised a number of factors that were important to school design, in terms of what was actually built and the process by which it was achieved. He argued that the key factors with the most significant effect on design were those of leadership and the collaborative nature of the design process. The Head of Junior School emphasized a number of design features that she believed had a direct impact upon the delivery of teaching programmes, the most significant being: the amount of storage and floor space available for use within a classroom; movable walls for
introducing variety into the configuration of spaces; a range of spaces for different modes of learning and delivery; and Information Technology resources.

Features such as natural light, ventilation and comfort also mattered. From an architect’s point of view, flexibility and adaptability were important aspects of a school facility, but only if there was a purpose for having these features in the design. The architect said master planning by the school was crucial to a successful design. When asked to identify the most influential factors in designing and building schools, the consultant listed them as: community perceptions and teacher perceptions of education and facilities; finances, and leadership by the Principal. From the students’ perspective, four themes emerged and there was no significant difference in responses based on gender, other than girls giving slightly more returns than boys on preferences for quiet or specialist work areas and independent-tasks. The most common themes were access to information technology resources, the negative impact of distractions, access to enough room to work (including storage) and access to outdoor areas.

I found a high incidence of architectural features in the buildings that coincided with the personalised and learning-focused patterns of school design. There were multiple examples of design elements typical of these patterns, such as human-scale structures, distributed resources, personalised storage, home bases and a variety of flexible spaces. Whilst not as numerous, features of collaborative and flexible design patterns were evident in the college. There was also significant evidence the college had moved through a phase of developing neighbourhood configurations that were now being replaced with the concept of villages.

The analysis of the 126 photographs taken in ten different areas of the college revealed the use of five architectural patterns for learning: personalised, learning-focused, collaborative, community connection and adaptable/flexible (refer to Appendix 1). Aspects of learning-focused and collaborative patterns were evident in spaces such as the Year 6 classrooms in the configuration of the furniture (student desks in groups, communal work areas containing computers, data projectors for
group presentations), the wet areas and the use of integrated information technology, as well as the IRC’s provision of individual and group work areas and its connection to the outside amphitheatre. Of all the patterns typical of learning community architecture, these two patterns were the most evident in the design of the educational facilities at Acacia. Flexibility and adaptability were also evident in features such as operable walls, the auditorium complex and the original module design. Personalised patterns were evident in aspects such as signage, student storage, and use of human-scale structures.

The Head of Junior School thought the Year 6 model encouraged a learning community approach and thought educational leadership needed to ensure the Year 6 programme transitioned students successfully to the secondary context. Therefore, she was working with the Year 7 teachers to build continuity into the curriculum and pedagogy. She did express a concern that the close relationship students experienced with their learning environment might be challenged by the structure of secondary, and the learning community approach would be a one year experience for the students. She anticipated secondary programmes would not specifically extend the learning community experience.

According to the consultant, the modules at Acacia when first conceived were designed to support flexible progression and were micro-versions of ideas he had for centring school campuses around the library. In the consultant’s design, 100 students would be ten paces from the resources required to achieve their learning outcomes and glass windows would provide the passive supervision by the teacher without limiting the flexible work patterns of each student. Learning community theory was not a reason for the modules’ design and did not play a part in the educational theory the design was intended to support. J’s experience suggested students working in pairs was the most effective way of fostering a positive and effective learning culture with each student taking turns in stimulating ideas, coaching and encouraging perseverance when the other gives up. Pairing students limited distractions whilst still providing alternative inputs. It is important to note this approach is not dissimilar to co-construction of knowledge and collaborative approaches to learning discussed
in learning community literature. Whilst not originally designed according to learning community theory, Acacia College has begun to use and adapt these flexible facility designs to support some aspects of the learning community approach.

There was evidence that the educational facilities and physical environments at Acacia could support the pedagogy associated with learning communities. There was evidence of spontaneous communities of learners emerging within individual classrooms, facilitated in part by the design of the educational facilities and in part by the middle school approach. Whilst the distribution of these types of facilities and environments was not consistent across the campus, the Year 6 classes were given access to a number of these spaces, such as the art rooms and science laboratories. However, overcrowding in the block of classrooms allocated to Year 6 had diminished the impact and flexibility of these spaces. This in turn created a certain degree of physical discomfort and considerable distractions, as reported by the students. Access to laboratories and specialist rooms was controlled by the timetable and these facilities were not in the immediate vicinity of the Year 6 classrooms. Therefore using the design metaphor of villages, Year 6 had to travel to other neighbourhoods and villages to access the range of facilities that support the middle school curriculum. Approaches to adopting learning community culture was more individualised, appearing in different parts of the college, such as the Year 6 cohort.

Students thought factors like access to resources, especially Information Technology, access to flexible outdoor spaces, adequate storage and space to complete a variety of activities were significant factors in creating a great place for learning. Eliminating distractions like noise and student behaviour was believed to have a positive effect on creating learning environments.

A comment needs to be made on the non-returns from activities that invited teachers to respond. One staff member said she was only an aide so could not comment on the issues that seemed to belong to teachers’ work. This aide worked in the resource-rich, flexible IRC dedicated to facilitating independent research activities. This led me to
consider why staff feel unequal to commenting on design. I will return to this finding in the final chapter, as I consider it in all three cases.

The Principal told me one of the main reasons for Acacia’s involvement in this research project was his belief that the built learning environment mattered, that it had a vital role to play in the learning process and that “good buildings are child centred”. He also saw the built environment as a part of a larger vision for education at the college. He described his overall philosophy in the following way,

... it seems to me that we ought to be encouraging people not to be limited by space and time. So, I will do that in more than just buildings, I will do that in terms of curriculum or I will do that in terms of welfare. I will encourage a personal vision of the educative process constantly.

The architect said the Principal was committed to facility design, and in his opinion, the Principal at Acacia was unique amongst educational leaders in his views on the role the built learning environment played in student learning and his enthusiasm for designing facilities. The architect said this Principal was thoughtful and well-informed in his approach to designing Acacia’s built environment.

This case study identified the importance of leadership in creating great places for learning and delivering educational facilities that support the habits of learning communities. Leadership, both formal and informal, was vital. The Principal of Acacia College emphasised and demonstrated the importance of leadership in the process of designing facilities that would be used to support the college’s learning culture. Acacia’s Principal was in contact with the daily work of the college, as well as working on the college’s strategic plan. He kept abreast of the latest publications in the educational fields and met regularly with the consulting architects. The Principal conveyed the belief that to be an effective leader one must be able to articulate the needs and concerns of a wide range of stakeholders, form and disband project teams, plan strategically, manage change and comprehend the language of contemporary design and its suggested connections to learning.
Another finding of this study was the importance of relationships within the college as a fundamental aspect of the learning culture. The college culture, as reflected in documents, emphasised the role relationships between students and teachers play in the learning process. Interview responses underscored the influence relationships had upon enabling or disabling effective learning environments. Education was seen by the teachers and students as a very collaborative human activity, particularly in the classroom.

Finally, the participants in this study gave insight into the effect of the physical environment on learning and the learner. The data indicated that teachers were concerned with creating inclusive, flexible environments that permit both independent and group learning spaces; leaders were aware of their responsibility for providing effective facilities, on budget, on time and in line with strategic and master planning and students’ concerns concentrated on the immediate and emphasised access to a range of resources and spaces. When combined these three perspectives suggested the existence of a dynamic relationship that linked people to the places where learning was happening in a location called school.

In the final chapter I will bring together the findings of the three case studies in a cross-case discussion that will answer my key research questions. I will also make recommendations for further research.
Chapter 8: Key findings and implications for research

This final chapter returns to the research questions posed in Chapter 1. Below is a table (Table 6) summarising the key findings of this study in response to the four research questions. The first sections of this chapter explain these findings in greater detail and triangulate the key findings from the three case studies to the relevant literature reviewed in Chapter 2. The chapter also discusses the key findings in reference to the theoretical framework explained in Chapter 3 and offers recommendations for further research and practice. The researcher proposes a robust theoretical model for a clearer understanding of the dynamics between educational leadership, the learning environment, the students and their teachers.

<table>
<thead>
<tr>
<th>Key Question</th>
<th>Main findings</th>
<th>Source of findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are the intended outcomes of school design from the perspective of stakeholders and in relation to the specific school contexts?</td>
<td>Comfort and wellbeing (teachers and students in particular)</td>
<td>Document reviews</td>
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<td></td>
<td>Community relationships</td>
<td>Interviews (educational leaders, teachers, students)</td>
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<td></td>
<td>Support/reflect school culture</td>
<td>Architect’s interview</td>
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<td></td>
<td>Facilitate curriculum</td>
<td>Researcher observations</td>
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<td></td>
<td>Space to carry out teaching and learning activities (teachers in particular)</td>
<td>Questionnaire</td>
</tr>
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<td></td>
<td>Flexibility and adaptability (school leadership and designers in particular)</td>
<td></td>
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<td></td>
<td>Affordability (school leadership in particular)</td>
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<tr>
<td>Key Question</td>
<td>Main findings</td>
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| 2. What are the key influences on the design of school architecture and use of educational facilities? | Change agendas  
Embedded school culture  
Curriculum  
Constraints, compromise and processes for negotiations  
School context  
Affordability  
School growth (time and urgency)  
Approaches to master planning  
Structural organisation of school | Document reviews  
Interviews (educational leaders, property managers, teachers)  
Educational consultant’s interview  
Architect’s interview  
Participant Generated Photographs |
| 3. What is the relationship between architectural and design factors and the development of an effective learning environment? | Relationship does not cause development of an effective learning environment. Design and architectural factors operate as preconditions for developing the learning environment.  
Creating learning communities was affected by scale, existing or envisioned learning culture, cultural emphasis upon community relationships, opportunities to create communal and personal space within a classroom and access to a variety of learning spaces.  
Factors identified as being influential in developing effective learning environments:  
- people who use the spaces have control over the environment  
- access to resources (especially I.T.)  
- flexibility  
- sufficient physical space to deliver the planned curriculum  
- site/master planning. | Document reviews  
Interviews (educational leaders, property managers, teachers)  
Field observations, site visits, photographs  
Questionnaire  
Participant Generated Photographs |
4. How does the leadership in schools influence the design of physical learning environments?

Principal identified as central to the entire process of building the physical learning environment.

Principal identified as playing key role in embedding learning culture and leading change.

Collaborative processes involving stakeholders identified as crucial for achieving best design.

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<tr>
<td>4. How does the leadership in schools influence the design of physical learning environments?</td>
<td>Principal identified as central to the entire process of building the physical learning environment. Principal identified as playing key role in embedding learning culture and leading change. Collaborative processes involving stakeholders identified as crucial for achieving best design.</td>
<td>Site visits Interviews (educational leaders, property managers, architect, educational consultant, teachers)</td>
</tr>
</tbody>
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Table 6: Main findings

8.1. Factors that build learning environments

A significant amount of the literature argues school design matters and the influence of design is subtle (Woolner, 2010; Young, 2003; Higgins et.al, 2005; Taylor, 2000 & 2009). However, establishing a causal relationship between the physical environment and learning is complex. The relationship between the physical and learning environments is influenced by a variety of factors, some of which are specifically related to architectural features of the design, while others are closely linked to individual school context and the nature of relationships within each school. This study shows the learning environments are affected by affordability, time constraints, master planning, the inclusiveness of the design process, the roles the various stakeholders take in the design process and how space is interpreted and valued by each stakeholder. The following section explains the factors that were key to building learning environments within the case study schools.

The architectural features within the design of a school that were seen to have the most significance were: space, Information Technology resources and comfort. The key factors were perceived by stakeholders as being important in effective physical environments and thereby contribute to the development of communities. Different stakeholder groups also placed additional features in the list of significant factors.
Both students and teachers identified space and Information Technology resources as being important. Space was usually linked to issues of availability of storage within the classrooms, sufficient floor space to accommodate the furniture and activities that took place within the classroom, flexibility in the configuration of spaces and comfort. Control over space was an important factor. Teachers and students wanted a range of Information Technology resources available in the learning space, and the technology had to be reliable and accessible. In the case study schools, these resources were integrated into teaching spaces but the main issue revolved around how readily students could access these resources, especially when they were shared with other classes or located in other rooms.

Teachers and the architect emphasised the need for space to be flexible and adaptable. These two features provide variety in the types of spaces that could be configured and scope for future changes in the use of a space, especially important in schools that are building in stages according to enrollment growth and levels of affordability. According to teachers, the curriculum and school culture were more important than the design of the facilities in the creation of learning communities, but this may have been influenced by the fact that these two factors were less dependent upon the constraints that hindered the design of the physical environment. Teachers usually identified operable (moveable) walls as being helpful when creating variety in learning spaces. Teachers also reported a balance between personal work and collaborative work spaces was influential in creating effective environments for both students and teachers. Spaces needed to be flexible and adaptable to provide disability access. Whilst only mentioned by one teacher, this factor is significant. Current learning community literature is relatively silent on students with learning disabilities and difficulties. In the three cases, the integration of students with disabilities focused around provision of facilities that complied with disability legislation and designs only take into account the physical needs of existing student populations.
In addition to space and integrated Information Technology resources, students emphasised features that created physical comfort and access to outdoor areas. Students felt the impact of a range features in the classroom were crucial to their comfort and sense of wellbeing. Most of these features related to the provision of storage, to the size of the room in relation to the number of students and the provision of designated working spaces for each student. Students often described comfort in terms of being free from distractions, especially distractions created by other peoples’ behaviour. The students’ emphasised access to outdoor areas because those environments offered solitude, fresh air, a pleasant ambience, variety, room to be physical and an opportunity to engage in informal activities. These reasons may also indicate factors that are related to the comfort that students valued in their learning environments. Students liked the features typically found in library and resource centre areas, such as the provision of a variety of group and private work areas that were equipped with a significant amount of resources available for use by the learner. Comparison with these learning spaces was often made as the benchmark when describing effective learning environments.

All the features identified by teachers and students agree with what has been identified in the design literature as what matters the most in educational facilities in terms of adequacy and post-occupancy satisfaction. The ACNeilson 2004 report for the NZ Ministry found the aspects stakeholders considered essential for good school design were: control over temperature; lighting; adequate space for the task undertaken; and availability of necessary resources in the space. The report identified the elements that influenced learning as Information Technology; defined pathways around the school, friendly welcoming atmosphere and outdoor links so that the facility sits within its environment. Unexpectedly, the factors identified in this study as being the most significant in creating places for learning were less numerous in comparison to other studies where the focus is on specific architectural features.

Other studies, such as Bishop (2010), found there is an increase in morale and positive behaviour when old buildings were replaced but not that new buildings had more impact on teaching and learning than the old. Therefore, newness was not the
crucial factor but the inclusion of specific elements like natural light, open space in hallways and common areas. Therefore, refurbished buildings could work as well as new ones. My study supports this finding by arguing that teachers’ own efforts to modify and adapt their spaces is an indication that specific elements matter more than newness. Teachers focused on the number and variety of spaces available in their classrooms for the planned learning activities, the balance between collaborative and individual work spaces and the provision of reliable Information Technology resources. An American Architectural Foundation study (2008) looked at what matters to students in the design of their learning environments and found five elements mattered. Four of these matched the findings of my study, and these were: design for variety and flexibility; comfortable and social spaces; integrated technology and connection to the outdoors.

The findings of my study also agree with aspects of a study by Earthman (2004) that concluded some of the features that had the most impact on student achievement were: human comfort, indoor air quality, lighting, acoustic control and student capacity (measured by student to facilities ratio). Fisher’s research (BCSE summary 2007) found the best classrooms provided space and flexibility. According to the teachers and students in that study, the best classrooms provided plenty of space, and in particular, sufficient space for ease of movement and the ability to change the configuration of the space. Primary teachers also valued space that enabled areas for specific activities. Comfortable seating and quality desks, stimulating surroundings and control over the quality of air and lighting in the space were also key factors in creating the best classroom. Lippman (2010) also argues a number of specific features in the learning environment and design principles are necessary for a learning community in a school, and those that concur with my study are: privacy, personal space, access to resources, control over the physical environment, comfort, the ability for individuals to manage their interactions, flexibility, Information Technology, flow, place attachment and place identity. He also argues space is crucial for achieving the layout of a learning community, suggesting twice the traditional size of a classroom in the USA with the space accommodating 50 students with two
teachers. This model is similar to the configuration of spaces for the Middle School classes at Acacia and Grevillea Colleges.

In the case study schools, community was built around the notion that personal relationships benefited from smaller numbers in the school. However, as already discussed, affordability was directly linked to the size of a school. To overcome this problem, the schools divided into smaller communities within the school as enrollments increased. A number of studies (Lippman, 2010; Lackney, 2003; Fuller et al., Fielding, 2005) argue smaller schools are good for student achievement and collaborative pedagogies. My study also concluded there was some agreement with other research that argues configuring facilities into what are called “streets” and “neighbourhoods” is effective for designing and developing small schools within larger ones, as well as adopting the pattern of a home as a template for the classroom environment, with the provision of additional communal space for shared resources (Bersagel et al., 2007; Lippman, 2010; Lackney, 2003; Nair & Fielding, 2007). One teacher at Grevillea made a specific comparison between the design and feeling of a home and his ideal learning space. In summary, it is important to note that while smallness is no guarantee that learning community practice will be established, there are indications that it is a necessary precondition. The practice of maintaining smallness in the case study schools suggests they believed small schools had a positive affect on learning relationships and communities.

8.2. Factors that build communities

The study identified a number of factors that contribute to the building of community within a school. Some of these factors are related to the physical environment and others to the work of a school. The key factors were control and a culture that valued relationships and fostered a sense of belonging to a community. Features within the design of the physical environment that were seen by stakeholders as supporting these factors were perceived as elements that constituted good design. These features tended to create transparency and inclusion for the community that owned the space.
(for example, a class in its own classroom), whilst providing privacy and comfort for individuals within that space. This study found the most fundamental relationships that built community existed between the teacher and the students.

Schools that had a pedagogy that emphasised learning community approaches and an educational philosophy that emphasised the importance of relationships between members of the school community did not rely upon the physical environment for building community and fostering a sense of belonging. The design of the physical environment was expected to grow out of the existing pedagogy and culture. This notion poses the question of when are these factors determined for a new school. This study found the case study schools had foundational statements that embodied the vision and aim for the new school and because the physical environments were built in stages, the schools had an opportunity to develop and reflect on the pedagogy and learning culture over a number of years. This would not be true in schools where all the facilities were built before occupancy. Therefore, this study found the process of building in stages, whilst creating difficulties as previously discussed, can have significant benefits for the design of the environment. The school had more time to refine and embed a pedagogy and culture before the design of the physical environment was fully realised. However, the success of the final environment would be dependent upon strategic and master planning.

Fostering a sense of belonging was important to building a community. There was evidence that the configuration of educational facilities around the notion of neighbourhoods positively supported access to limited resources and the development of relationship between communities within the school. Students and teachers identified with the neighbourhoods where their classrooms were situated and rarely placed themselves in the context of the whole school. Unfortunately, annual re-allocation of spaces discouraged teachers from long-term planning and commitment to specific neighbourhood facilities (that is, maintenance of resources and personal involvement in the development of the physical environment). Teachers also described a form of resource “envy”, if preferred spaces were assigned to other
classes. Therefore, re-allocation of facilities and resources can be detrimental to community and building place attachment.

Ambience was valued as a factor that contributed positively to a learning environment. Students and staff wanted the environment to feel safe, secure and comfortable. These characteristics were seen as preconditions for supporting learning relationships within the school. Hubs of interaction and private places of retreat were identified as contributing to creating these preconditions but these alone will not cause relationship to develop. The study found the cultural expectation of the school was key. The staff and students at these schools valued personal relationships as a foundational principle of their school culture. What followed was a belief that learning was based upon positive relationships, especially between the teacher and learner. Consequently, factors that had an impact on this relationship became significant in the process of designing effective learning environments.

The study found stakeholders were frustrated when they did not have control over their environment. Lack of control resulted from a combination of features within the design of the physical space, the staged development of the school and processes for managing change. Buildings did matter but sometimes due to the negative impact they had on building community. As discussed in earlier chapters, the schools that formed the basis of this study experienced a particular cycle of growth and development that had a direct affect on the construction of the built environment. Whilst architectural features were able to contribute both positively and negatively to the learning environment, the teachers and students drew upon a diverse range of resources to build their learning communities. The study recognised the factors discussed in this chapters did not guarantee the creation of a learning community culture nor an effective learning environment. However, they all contributed to the preconditions necessary for the development of an effective learning environment and community.
8.3. Key influences on the design of learning environments.

According to this study’s findings, the planning process and various constraints had the greatest direct impact upon the design of an educational facility. The study also found a number of other key influences that affected the design of learning environments in the schools: the main ones being context, leadership, affordability, change agendas, collaborative planning and willingness to compromise when designing and finalising their building projects.

8.3.1. The importance of school context

There were a number of contextual features that were common to all the case studies and were important in their influence upon the relationship between the built and learning environments. The influence of school context has been noted in the literature, especially in the research conducted in preparation for large capital investment programmes and evaluations of these projects (Higgins et.al., 2005; PricewaterhouseCoopers, 2010). A respect for contextual compatibility whilst providing design diversity has been advocated in the literature (Lackney, 2003; Alexander, 1979; Uline et. al., 2009). Similarly, Lackney (1996) has argued that there is no single set of environmental quality design attributes that can be applied to all schools as each school has its unique contextual realities, needs and experiences.

While this was the case for the schools in this study, there were a number of points in common, such as incremental growth as determined by enrolments and independence to determine the design of the school. There were also points of difference such as the extent of strategic planning during the establishment stage and cohesive planning during the following stages of development. All of the case study schools were Kindergarten to Year 12 campuses, which meant each site had to accommodate the unique needs a wide range of ages and plan for at least three distinct departments within the school. In New South Wales, these departments are traditionally Infants (K-2), Primary (3-6) and Secondary (7-12). All three schools had established their
school structure around these departments, however, Grevillea and, to a lesser extent, Acacia had recently modified the structure to include middle schooling. Nonetheless, all the three schools needed to consider the facilities required by three distinct departments on one site. These schools had experienced challenges in maintaining the same locations on site for each department, as a result of the staged building programmes or the absence of a master plan. Not one of the schools was completed before occupation, instead facilities were constructed as the student population grew in stages. Such unplanned growth triggered building projects. Even at Acacia College, where a master plan for accommodating annual growth had been planned by the construction of individual modules, the underlying pedagogy that had informed the original design had changed over a space of ten years. At the time of the study, the school was experimenting with using the design to support a middle school pedagogy, whilst in other parts of the school similar buildings were supporting other approaches to the curriculum.

These schools, unlike government schools, enjoyed unique autonomy whereby they were able to make independent decisions over the design of the physical environment. Whilst there were many other constraining and influential factors, which will be discussed in the following sections, the schools were not required to adopt a pre-determined design even though they received some funding assistance from outside organisations/agencies, such as the federal government. This freedom to design the physical environment was a part of the general independence the schools enjoyed in terms of building their own school community. To sum up, a valuable feature of the schools was their ability to build the learning environment according to the school’s context and culture. Each of the schools expressed a vision, philosophy and educational goals that emphasised a sense of community as being key to school culture and a concern for building relationships within that community. The study confirmed this emphasis upon community and found the schools did indeed know how to build a community through relationship.

Although much constrained by circumstances that affected the construction of the physical environment, the schools were developing learning communities through
the establishment of smaller departments, middle school approaches, an emphasis on the teacher-student relationship and fostering a sense of belonging to the community. At the time of this research, the pedagogy of a learning community was emerging spontaneously out of the schools’ contexts. The emerging pedagogy favoured enquiry-based learning based on combinations of individual and collaborative activities in both smaller class and larger stage groupings. Teachers were designing flexible programmes that utilised technology and a variety of adaptive workspaces.

8.3.2. Compromise and negotiation

This study’s findings highlighted the contrast between the acknowledged centrality of the classroom, the relationships between teachers and their students and the inclusion of these stakeholders in the actual planning processes. A mismatch between the core focus on the classroom and stakeholder involvement has also been raised by researchers in the area of design (Burke & Grosvenor, 2003; Kube, 2006; Sanoff, 2000). From the perspective of the principals in this study, the design of the physical environment should work for the purpose teachers had in mind. However despite this view, there was some sense that when the teachers and students were not involved in the consultative phases, the reality of the classroom and teachers’ practice was absent from the design.

As noted in the literature (Earthman, 2009), poor design can have negative effects that need to be managed within context. It was evident that where a school’s physical buildings were unable to supply facilities or resources the teachers wanted for their classes, the staff adapted and modified the existing physical environment. The fact that teachers could adapt and modify their teaching areas was a dimension of the schools’ particular contexts. One teacher at Grevillea described this approach as being entrepreneurial. Despite the potential frustration of having problematic facilities, teachers in the schools were able to consider making modifications and adaptations in response to their teaching practices. This also generated a degree of attachment to the spaces and facilitated personalisation of the classrooms. However, when contemplating adaptations and modifications to existing facilities, the teachers
were conscious that the same constraints that had influenced the original design could affect their plans to vary the facilities after occupancy.

Other factors which constrained the design of the physical environment revolved around issues of affordability and time. Finances were directly linked to enrollments. The case study schools made this link clear and highlighted its influence over what was possible at a particular time in the school’s development. For example, Acacia College could afford to design more expensive facilities as the college became more established, but its Principal argued the college still could not afford to build anything that was not likely to directly attract more students. These schools could not initially afford to build all the facilities that would be required in the future. Therefore, an important finding of this study was the reality of compromise. The schools were not unaware of the impact compromise would have upon teachers’ ability to carry out the daily work in the classroom and the frustration and disappointment “a less than hoped for” facility could create. Although the schools wanted the best designs, funding constraints meant that compromise had to be made in the design of the built environment.

8.3.3. Planning, collaboration and leadership

Collaboration and planning

Differences in the perspectives of the students, teachers and educational leadership and degrees of involvement of each group were congruent to some extent with the Domain Theory of human service organisations (Dappen & Gutkin, 1986; Kouzes & Mico, 1979). Kouzes and Mico argue that people who occupy roles in the different domains within an organisation view it from different vantage points and have different perspectives of the reality of the organisation. Each domain [policy, management, service] has separate governing principles, values, measures, structures and work modes, and while they are all part of the same organisation, the perspectives they hold about their domain and other domains can be incongruent or discordant. Hence from the teachers’ perspective, the classroom may be perceived as having been overlooked by the principal or architect. The theory also suggests the
Service Domain, which in a school is the classroom domain, prefers autonomy and self-regulation. From the findings of this study, it is possible to argue teachers believe more in their ability to adapt and modify an inadequate learning environment than in their ability to influence the design of the physical environment at construction. The perspectives of the educational leadership, designer, teachers and students could be attributed in part to their own relationship with the process of designing the school and interactions with the facilities after occupation. A school’s context and culture also has an influence on the perspectives of the stakeholders. In the case study schools, some of the teachers conveyed a sense that what could be achieved might be in contrast with what was hoped for. While this mismatch did generate some frustration with a less than perfect fit between purpose and design, it was expected and accepted as part of the school’s specific context. The educational consultant’s perspective on stakeholder’s goals added to the emerging sense that teachers and students expected to modify and adapt facilities during use, in part to compensate for inadequacy but also in part to personalise the learning community and build attachment to place within their domain.

One theme running through design literature is the ability of stakeholders to work effectively in collaborative teams with the goal of maximising congruence between design and intended purpose (Bickford, 2002; Lackney, 2003; Sanoff, 2000; Tanner & Lackney, 2006). Time constraints had an impact upon the extent to which collaboration was carried out during the planning stages for each project. The way in which the process was managed directly influenced the design of the physical environment in the schools. Master planning was evidently key to managing a staged approach to building schools, and the difficulties two of the schools had in maintaining a cohesive environment were in part due to a lack of a masterplan. In all three schools, the challenges of managing a building project within a limited timeframe were significant. The lead-in time for a project was at times too brief for detailed consultation to take place. The more complex the educational requirement for the design, the more complex and lengthy the design process became. The management of the project was delegated to the College/Property Manager, which meant the Principal had to exercise leadership over the project through this
delegation. In all three cases in this study, the different stakeholders looked to the principal as the focal person who negotiated and managed competing needs and demands.

Although the importance of collaboration between all stakeholders was emphasised both by educational leadership and the architect, the teachers did not feel they had a role in the design process, but why this was the case was not clear. There are a number of possible reasons for this situation. A school’s building projects could be seen as more closely aligned with the administrative work of the College/Property Managers and the Principals than the work of the teachers, especially since buildings involve budgets and contracts with other industries and organisations. The design professionals are usually engaged by senior executives within a school and the evidence indicates these professionals tend to negotiate through the senior staff. It also may be in part due to the existence of a hegemony of design professionals that excludes user input during the design process, as Fisher (2002) has suggested. Another possible reason is linked to time constraints. Since the case study schools were built in stages, some of the staff who were going to use the facilities were not yet employed until the following year, so teacher input was not possible. As the schools matured, there was evidence that teachers were consulted by educational leadership more regularly. In all the schools at the time of the study, the pace of growth and building had slowed in comparison to the years of establishment. As shown in Acacia College and Grevillea College with the introduction of middle schools, staff had more time to comment on the design of existing buildings and be involved in discussions of future building developments.

Leadership

Academics working in the field of educational leadership argue leadership is key to student and educational outcomes (Dinham, 2004; Robinson, 2008), that principals need to deal with whole school concepts and principals are primarily responsible for leading learning (Crowther, 2002; Lingard et.al., 2003; Starratt, 2003). This study identified the pivotal role the principals played in the construction of an educational environment and the school’s learning culture. Some scholars (Sergiovanni, 2005)
also argue leaders can be both hopeful and realistic when the possibilities for change remain open, and this was evident in all three schools. The principals’ interviews indicated they were optimistic about the potential for their schools to grow and change in the years to come.

This study considered the role a transformational style of leadership might play in empowering schools to use the potential of their learning spaces to achieve learning outcomes and experiences. Literature in this area argues this leadership style is comfortable with asking questions and seeking responses from a wide range of stakeholders and sources. It should also be responsive to managing change in current times (Gurr 2008; Leithwood et.al., 1999; Leithwood, 2003). It is a leadership approach that emphasises the need for an educational vision to be understood and embraced by those it is intended to benefit (Birkett, 2003) and this often means change for teachers (Brogden, 2007). It is argued by some academics that principals have access to strategies that are transformational and can lead to collaborative cultures (Leithwood et.al., 1999). Collaboration is seen as crucial to interactions between leaders and followers that recognise the interdependency of all parties in the relationship (Spillane, 2005). Other researchers have argued for added dimensions to the leadership that are specifically required for building learning communities. These dimensions steer practice away from narrow instrumentalism towards constructing communities defined by their central values, sentiments, and beliefs (Bates, 2003; Sergiovanni, 1999). I theorised a transformational style of leadership that emphasised collaboration amongst the staff could develop learning communities within the school. However, my study indicates this process of collaboration relies in part on continual leadership from the principal.

The teachers, the architect and staff in leadership and management positions at the schools expected the principal to fulfill the key role in the process of designing and developing the school’s physical environment and learning culture from beginning to end. This agrees with other studies where teachers believe leaders can do something about unsatisfactory facilities (Buckley, 2003). Whilst the study did not investigate the relationship between leaders and followers, it is possible to say the school
cultures recognised the interdependency of all people engaged in the process of designing the learning environment and the importance of the interactions. Despite educational leadership and teachers expressing a desire for collaborative leadership practices to be adopted when designing the learning environment, it appears factors such as time constraints, school context and planning processes had an impact on the extent to which these practices were evident in the schools.

In all three schools, the principals spoke about leading a school that shared a common vision and educational goals. In particular, the Principal at Acacia College stated his role as involving the process of articulating and modeling the school’s educational culture and vision to the staff and students. As Principal, he also saw his role involved guiding the implementation of this culture and vision through collaborative leadership with his executive team and the college’s teachers. It is also argued in some leadership literature that behaviour sometimes changes before belief (Fullan, 2008). The Principal and Head of Middle School at Grevillea College had been implementing the new middle school approach for a number of years and there was evidence in the students’ and teachers’ responses that a shared belief in the new approach was emerging.

Whilst I had anticipated the significant role the school’s principal would play in the process of designing and constructing the physical learning environment, as well as the role the principal would play in articulating the school’s learning culture and vision, I had also anticipated teachers would be influential in the domain of the classroom. The findings of my study indicated that this was so. In most cases, the classroom teacher reported their leadership over the class environment during the work day. They negotiated the daily use of the space with their students and made decisions when applying the curriculum in the physical classroom setting. For example, at Grevillea, the teachers’ application of the SmarTrack programme was evident in the way they set up their classrooms and negotiated access to resources.

8.3.4. Change agendas
Research literature highlights the impact change agendas can have upon schools (Hargreaves, 2003 & 2009; Woolner, 2010). These agendas can be both internal and external to the school. According to current school design literature (Earthman & Lemaster, 2009; Higgins et al., 2005; PricewaterhouseCoopers, 2010), the process of implementing and managing change within a school’s context has a greater impact than any one architectural element chosen to improve. All the building projects in the three schools were staged over a number of years, so that each new project was influenced by shifting agendas. For example, a shift in the pedagogical approach at the school level can have an influence on the design of the physical environment, as seen at both Grevillea and Acacia in the accommodation of their middle years. Even with a master plan in place, school facilities at Acacia College needed to be adjusted to the current context and changing conditions.

Educational facilities are long-term features of a school whilst decisions affecting the educational direction of a school can be much shorter in duration and effect. From the evidence of the case study schools, it was apparent that even new schools can experience change in the educational direction in the space of only a couple of years. All three colleges had experienced significant growth in student enrollments, which had hastened the need to construct new facilities each year. Decisions concerning the structure of departments within the school, for example the middle school years, were sometimes made quickly when an increase in student numbers opened up new opportunities and building plans were needed for the next building project. In the area of curriculum development, shifts were rapidly occurring as a result of new digital and Information Technology resources and approaches to online learning in the past fifteen years. A relatively new building could require modification as technology changed, for example, moving from a cabled to a wireless network or the impact on the orientation of a classroom when digital projectors are installed. These types of Information Technology driven post-occupancy changes to buildings occurred in all three schools studied. It was clear that built environments could not rapidly respond to all the changes that occurred within the schools.
8.4. A theoretical model for understanding the relationship between the students and their learning environments

Literature in the area of school design presents the argument that good design depends upon teachers and they need new knowledge about how to use new designs (Gurr, 2008; Wilks, 2010). If they have this knowledge and a language with which to express their notions about space, teachers will be able to collaborate more actively in the creation of physical environments. Some of the literature addressing the design of educational facilities explores the notion of pattern language to conceptualise space (Bergsagel et al., 2007; Nair & Fielding, 2007). The patterns reflect the ways in which the designer conceptualises the pedagogy that might be used in a collaborative, information technology rich, enquiry-based approach and then translates these concepts into a series of design solutions. Alexander argued “towns and buildings will not be able to become alive, unless they are made by all the people in society and unless these people share a common pattern language” (Alexander et al., 1977, p.x). This study suggests the pattern language of school design was not shared by the stakeholders. Since the purpose of this language is to communicate human ideas and concepts, it could be reasoned that this absence of common language had an impact upon the design process and collaboration. In her research, Wilks (2010) found that teachers could not express visions of space without reference to existing examples. In the three case study schools, the teachers did not speak about their spaces in terms of pattern languages currently used to define collaborative, enquiry-based facilities. Instead, the study found teachers and students described space in reference to opportunities the space afforded them to achieve a learning outcome or action. When imagining new places, they made direct comparisons to resources and facilities already in existence.

These findings led me to consider the role language plays in articulating the design and function of learning spaces. The current pattern language of collaborative, enquiry-based learning facilities is widely discussed in the design literature but it appears teachers and students do not articulate their understanding of the learning environment with this language. What was common amongst all the stakeholders
was the emphasis placed on what mattered to them in the physical environment. Teachers and students talked about affordances in specific settings. The architect in the study articulated whole school architectural patterns and configurations of the physical design of individual facilities using an understanding of current *pattern languages*. Physical space was viewed as one of a number of preconditions for teaching and learning by teachers and educational leadership.

My study found there is a need to understand the relationship between learning environments and those who use those environments (that is, the teachers and students) in terms other than the language of architectural design. This led me to consider the articulation of the relationship between the environment and learning from the central perspective of the student. Following is a proposed theoretical model (Figure 13) that places the learner at the centre of a dynamic relationship with the learning environments using the notion of affordances (Heft, 1988) rather than *pattern languages*. The model is a way of understanding how potential affordances can be designed into that environment and how the affordances can be perceived and then actualised by the student within the context of a learning community. The model also shows how *pattern languages* and affordances can work together.
According to this non-hierarchical model, the student perceives and actualises (represented by the two arrows) the affordances designed into the learning environment. The student’s perception and actualisation of those affordances are also influenced by the guidance and actions of the teacher and other students, who have also perceived affordances within the learning environment. The relationship between the student, the learning environment, teacher and co-learners is focused through the affordances provided by the learning environment and loops continuously during the time spent in the environment. The learning culture provides the context with the student at the centre of the relationship between the environment and learning. Teachers and other students (co-learners) contribute their perceptions of the affordances offered by the physical space as part of feedback loops (represented by dotted lines and arrows) to the student. The environment suggests potential for action and the student perceives affordances as a result of experience and suggestion. Architects directly influence the attributes of the environment and can design in the potential for action by the learner.
Leadership is part of the loop that guides (represented by dotted lines and arrows) the architectural brief that leads to the design of the physical environment. Leadership evaluates the affordances offered by the environment and uses this knowledge to inform the next design or modifications to existing facilities. In environments not yet designed, I would suggest these perceptions are based on prior experience and exposure to a variety of learning environments. Educational leadership bears the responsibility of being conversant in the pattern language of design and the language of affordances as they lead the process of designing learning spaces. It is at this point that the understanding of affordances and pattern languages interact and leads to the process of designing the desired affordances into the architecture that contributes to the creation of the learning environment. This forms the second loop of interaction in the model, one that links affordances, educational leadership, outside professionals and the design of the physical environment.

My conclusion is that the concept of pattern language provides a language for the construction of the physical space and the theory of affordances explains how students and teachers see and use the spaces after construction. Both describe a person-environment system and are relational concepts. The pattern language articulates what is present in the human-environment relationship as a result of design and affordances are situated between the individual and the environment without being a characteristic of either of them alone. Since learning spaces are physical, they are therefore primarily related to the physical human responses involved in learning. Whilst affective responses are involved in learning, these responses are not primarily the focus of the learning facilities. The learner acts within the physical environment using physical actions of learning like writing, reading, talking, making, demonstrating, storing, which lead to deeper cognitive processing like comprehending and understanding. To execute a physical action or response, the student perceives the affordance that enables or supports the physical action of learning within the physical learning environment. A teacher plays a role in “translating” the affordances that exist between the environment and learner. The teacher supports the students’ choices of responses and guides or informs the students’ experiences of the myriad affordances present in the physical learning
environment, in the same way a parent would do so for a young child at different stages of their development. With this guidance and support, students act more independently with a larger skills base of actions. The students can also act collectively on behalf of each other as they experience and actualised more of the learning space’s potential affordances.

It is at this point that it might be possible to speculate on a degree of causality operating within the architectural design, that is, after the human translation process and actualisation of the potential affordances. With repetition of the actualised affordances it may be possible that learning behaviours that are characteristic of a specific learning culture can be created in a more predictable way. Therefore a student’s perception of affordances in the learning environment, with the social and cultural shaping of this perception, might lead to predictable actions that are part of a specific learning culture and pedagogy. However, it is important to emphasise the function of the physical environments is to offer the potential affordances and not to determine actions. Teachers and students need to perceive and actualise these potentials in a relational transaction. Therefore, building design focuses on creating potential affordances and clusters of these that are linked to physical responses that are linked to specific pedagogies. Educational leadership can work with the perceiver to see and use potential affordances and with the architect to articulate the affordances that need to be designed into the environment. Simultaneously, a *pattern language* articulates the architect’s knowledge of the potential affordances that can be designed into that physical space. Therefore, a *pattern language* that codes and communicates the characteristics of a learning community is essential for understanding the physical learning environment from an architect’s perspective.

Finally, the model shows the student’s daily interaction with the environment taking place within the culture of a learning community. I would argue a contemporary learning community is characterised by an emphasis on scale, relationships, community, adaptive systems, flexibility and enquiry-based learning. A learning community values meaningful groupings of fewer than 150 people working together, and to make a larger school, multiple groupings are formed. A culture focused on
community unifies these groups into one school. Relationships are personal, participatory and collaborative in nature. The learning community is generated by potential affordances actualised through human action, and it is also the context where learner, teacher, co-learners and affordances interact through action.

8.5. Recommendations for future practice and research

The findings of this study lead me to make a number of recommendations for practice, policy and further research. Key recommendations for current practice are: to ensure more master planning of the design of a school takes place from the outset; more flexibility in the design of facilities in response to a school’s context; and an increase in teacher professional development in the area of using space as a part of pedagogy.

The first recommendation for both policy-makers and practice is to allow a school’s context and key stakeholders (this would be dependent upon the school structure but must include students and teachers) to play a significant role in the design of the physical environment. Building in one large project before occupation may be cost effective and expedient, if full capacity is to occur within the first years of occupancy, but the approach does not allow for changes as the school develops its own learning culture and vision. If a complete build is the only option, then extensive consultation with stakeholders before the design is finalised is recommended even given the difficulties of consulting with a school community not yet established. It is true a paradox exists between the need to build a physical environment in consultation with a community but that does not yet exist. This paradox is exacerbated by the constraint of time. This study’s findings lead to the conclusion that greater flexibility when responding to contexts will improve the fit between the physical environment and learning culture within each school. Improving each school’s approach to master planning could provide the opportunity of constructing the physical environment in stages whilst still achieving a cohesive design for the entire school. Another suggested approach for schools that find they must build the
entire physical environment in one project, is to construct flexible, adaptable “blank canvas” or shell facilities with sufficient funding held in reserve to refine and develop the built environment in unison with the school’s learning culture and context over a number of years.

There is also a need for specialist professional development and undergraduate education for teachers in the field of using space as part of classroom practice. As far back as 1996 Lackney found teachers needed knowledge about the design of physical learning environments. Leithwood and Jantzi (1990) also argue that learning culture and collaboration are fostered by staff development and teacher commitment to change, and by implication teachers must be equipped to deal with change. In recent years, there has been growing interest from within the architectural and educational communities for the provision of teacher professional development (Brogden, 2007; Wilks, 2010). Unfortunately, teacher training courses in Australia that include modules related to using the use of the physical environment as part of pedagogy are rare. If teachers’ participation in the design process increases, as recommended by this study, then teachers must be enabled to take part in that process.

The findings of this study also point towards a need for increased research into school design within the Australian context. Since context is influential in the design of a school, it is reasonable to argue that the national context would have an influence on school design and current studies of Australian schools are not numerous. Understandings of the relationship between the physical and learning environments would be enhanced by longitudinal studies that could investigate the long-term impact of early 21st Century designs on school learning culture, learning outcomes and the establishment of learning communities within schools. Further research on using affordances to understand the way in which teachers and students perceive space and the inclusion of students with disabilities in the spaces designed for learning communities would add richly to the existing literature in the area of school design.
To sum up, this study found school design matters in a profound way to all the stakeholders, but in particular, to the teachers and students. The relationship between the physical and learning environment is complex and at times chaotic. The context of a school has a significant effect upon the design process and the development of the physical environment. The school culture also has an impact on the way in which community is built. In the schools that were able to independently build their learning environments, they had the opportunity to draw directly from the school’s educational philosophy and vision when considering the design of the physical learning spaces. These schools did not see space as determining learning culture and communities. Instead, they valued the physical environment as one precondition for delivering the goals and vision of the school. Therefore, inadequate facilities did not stop the development of learning communities. Inadequacies definitely created challenges for the teachers and students, as well as feelings of frustration that spaces were not everything they had hoped for from a facility. However, this did not prevent teachers from modifying and adapting spaces. There was a distinct belief that no matter the design of the space, the teacher and students could make it work in some way that was positive. It is also possible to argue teachers could move the pedagogy away from one that was intended for an educational facility by making modifications that were reactionary (for example, covering up windows with posters or never opening up operable walls) or redirecting the use of a space through a different teaching programme, as was evident at Acacia.

A significant set of findings of this study relate to factors that affect the design of the physical environment. The issue of compromise, the impact of master planning, the nature of educational leadership and the constraints of affordability and time all had a profound impact upon the design of schools. The schools in this study found the process of building the facilities in stages as student enrollments increased was a mixed blessing. The school could evaluate previous designs, however, without master plans in place the environment would develop without a sense of cohesion. The dependency upon student numbers also had a significant impact on the capital available for each building project. The design of the school environment could
benefit from a leadership approach that was transformational and collaborative in nature.

Finally, the study identified a number of features within the learning environment that were seen as contributing to learning communities and effective spaces. These factors were: space, flexibility, access to resources, physical comfort, access to outdoor areas and Information Technology. Most importantly, teachers and students wanted control over their spaces and a place where they could nurture the relationships that already existed. Forming a personal attachment to the physical environment was significant, and involved developing a sense of belonging to both private and communal spaces.

This study found the most enduring influences upon the the relationship between the built environment and learning were dynamic in nature. The relationship could also be understood as a constant dialogue or interaction between the people, the purpose of schools and the places where this purpose is achieved. The relationship between leadership, the built environment and learning focuses on the classroom and what happens between teachers and their students. It is a problematic relationship since each group involved in the process of constructing educational facilities, as well as those for whom the facilities are constructed, look at physical spaces from different perspectives. These perspectives are framed by the different functions these groups see the physical spaces as fulfilling. These groups may even frame their perceptions using different languages. The relationship is both affective and physical, it involves both the practical function a space fulfills as well as its symbolic role.
## Appendices

### Appendix 1: Nair & Fielding Design Patterns for 21st Century Schools

<table>
<thead>
<tr>
<th>The Patterns</th>
<th>Pattern Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Classrooms, Learning Studios, Advisories and Small Learning Communities</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>2. Welcoming Entry</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>3. Student Display Space</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>4. Home Base and Individual Storage</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>5. Science and Art Labs, Life Skills Areas</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>6. Art, Music, Performance</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>7. Physical Fitness</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>8. Casual Eating Areas</td>
<td>Parts of the whole</td>
</tr>
<tr>
<td>9. Transparency</td>
<td>Spatial Quality</td>
</tr>
<tr>
<td>10. Interior and Exterior Vistas</td>
<td>Spatial Quality</td>
</tr>
<tr>
<td>11. Dispersed Technology</td>
<td>Spatial Quality</td>
</tr>
<tr>
<td>12. Indoor-Outdoor Connection</td>
<td>Spatial Quality</td>
</tr>
<tr>
<td>13. Soft Seating</td>
<td>Spatial Quality</td>
</tr>
<tr>
<td>14. Flexible Spaces</td>
<td>Spatial Quality</td>
</tr>
<tr>
<td>15. Campfire Space</td>
<td>Brain-based</td>
</tr>
<tr>
<td>16. Watering Hole Space</td>
<td>Brain-based</td>
</tr>
<tr>
<td>17. Cave Space</td>
<td>Brain-based</td>
</tr>
<tr>
<td>18. Design for Multiple Intelligences</td>
<td>Brain-based</td>
</tr>
<tr>
<td>19. Daylighting</td>
<td>High Performance</td>
</tr>
<tr>
<td>20. Natural Ventilation</td>
<td>High Performance</td>
</tr>
<tr>
<td>21. Full Spectrum Lighting</td>
<td>High Performance</td>
</tr>
<tr>
<td>22. Sustainable Elements and School as 3D Textbook</td>
<td>High Performance</td>
</tr>
<tr>
<td>23. Local Signature</td>
<td>Community Connected</td>
</tr>
<tr>
<td>24. Connected to Community</td>
<td>Community Connected</td>
</tr>
<tr>
<td>25. Bringing it all Together</td>
<td>Higher Order</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group of Principles</th>
<th>Educational Design Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Planning and design process</td>
<td>Maximise collaboration in school planning and design</td>
</tr>
<tr>
<td>2 Planning and design process</td>
<td>Build a proactive facility management program</td>
</tr>
<tr>
<td>3 Planning and design process</td>
<td>Plan schools as neighbourhood-scaled community learning centres</td>
</tr>
<tr>
<td>4 Planning and design process</td>
<td>Plan for learning to take place directly in the community</td>
</tr>
<tr>
<td>5 Site and building organisation</td>
<td>Create similar schools</td>
</tr>
<tr>
<td>6 Site and building organisation</td>
<td>Respect contextual compatibility while providing design diversity</td>
</tr>
<tr>
<td>7 Site and building organisation</td>
<td>Consider home as a template for school</td>
</tr>
<tr>
<td>8 Site and building organisation</td>
<td>Meander circulation while ensuring supervision</td>
</tr>
<tr>
<td>9 Site and building organisation</td>
<td>Design for safe schools</td>
</tr>
<tr>
<td>10 Site and building organisation</td>
<td>Cluster instructional areas</td>
</tr>
<tr>
<td>11 Site and building organisation</td>
<td>Provide space for sharing instructional resources</td>
</tr>
<tr>
<td>12 Site and building organisation</td>
<td>Design for a variety of learning groups and spaces</td>
</tr>
<tr>
<td>13 Site and building organisation</td>
<td>Keep class sizes small</td>
</tr>
<tr>
<td>14 Site and building organisation</td>
<td>Provide resource-rich well defined activity pockets</td>
</tr>
<tr>
<td>15 Site and building organisation</td>
<td>Integrate early childhood education into the community school</td>
</tr>
<tr>
<td>16 Site and building organisation</td>
<td>Provide a home base for every learner</td>
</tr>
<tr>
<td>17 Site and building organisation</td>
<td>Regard teachers as professionals</td>
</tr>
<tr>
<td>18 Site and building organisation</td>
<td>Provide studios to support project-based learning</td>
</tr>
<tr>
<td>19 Site and building organisation</td>
<td>Encourage administrative leadership by decentralising space</td>
</tr>
<tr>
<td>20 Shared school and community facilities</td>
<td>Establish a community forum</td>
</tr>
<tr>
<td>21 Shared school and community facilities</td>
<td>Allow for community conferencing space</td>
</tr>
<tr>
<td>22 Shared school and community facilities</td>
<td>Create privacy niches</td>
</tr>
<tr>
<td>23 Shared school and community facilities</td>
<td>Weave together virtual and physical learning spaces</td>
</tr>
<tr>
<td>24 Community spaces</td>
<td>Provide opportunities for job training</td>
</tr>
<tr>
<td>25 Community spaces</td>
<td>Provide parent information centres</td>
</tr>
<tr>
<td>26 Community spaces</td>
<td>Provide health care service centres</td>
</tr>
<tr>
<td>27 Character of all spaces</td>
<td>Design places with respect for scale and developmental need</td>
</tr>
<tr>
<td>28 Character of all spaces</td>
<td>Maximise natural and full-spectrum lighting</td>
</tr>
<tr>
<td>29 Character of all spaces</td>
<td>Design healthy buildings</td>
</tr>
<tr>
<td>30 Character of all spaces</td>
<td>Design for appropriate acoustics</td>
</tr>
<tr>
<td>31 Site design and outdoor learning spaces</td>
<td>Allow for transitional spaces between indoor and outdoor spaces</td>
</tr>
<tr>
<td>32 Site design and outdoor learning spaces</td>
<td>Establish a variety of outdoor learning environments</td>
</tr>
<tr>
<td>33 Site design and outdoor learning spaces</td>
<td>Separate children and pedestrians from vehicles and service</td>
</tr>
</tbody>
</table>
Appendix 3: Characteristics of Learning Communities, according to the literature

<table>
<thead>
<tr>
<th>Characteristic</th>
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</thead>
<tbody>
<tr>
<td>1. small (approximately 150);</td>
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<tr>
<td>2. “human scale”;</td>
</tr>
<tr>
<td>3. open to change and able to foster change;</td>
</tr>
<tr>
<td>4. reflective;</td>
</tr>
<tr>
<td>5. encourages autonomy;</td>
</tr>
<tr>
<td>6. focus is upon knowledge construction;</td>
</tr>
<tr>
<td>7. collaboration;</td>
</tr>
<tr>
<td>8. process;</td>
</tr>
<tr>
<td>9. physical and cognitive;</td>
</tr>
<tr>
<td>10. place, pedagogy and people combined into one unified, harmonious shared life</td>
</tr>
<tr>
<td>11. participants are members of a community;</td>
</tr>
<tr>
<td>12. learning focused;</td>
</tr>
<tr>
<td>13. participatory;</td>
</tr>
<tr>
<td>14. transformational;</td>
</tr>
<tr>
<td>15. creative;</td>
</tr>
<tr>
<td>16. innovative;</td>
</tr>
<tr>
<td>17. inspirational;</td>
</tr>
<tr>
<td>18. are built on social networking and support;</td>
</tr>
<tr>
<td>19. left and right hemisphere activities work in harmony;</td>
</tr>
<tr>
<td>20. engagement by influencing each other;</td>
</tr>
<tr>
<td>21. explicit quality criteria;</td>
</tr>
<tr>
<td>22. active;</td>
</tr>
<tr>
<td>23. inclusive;</td>
</tr>
<tr>
<td>24. self-managing;</td>
</tr>
<tr>
<td>25. “I” thinks about “we”;</td>
</tr>
<tr>
<td>26. operates by mutual benefit;</td>
</tr>
<tr>
<td>27. increased responsiveness;</td>
</tr>
<tr>
<td>28. fit for people, fit for purpose;</td>
</tr>
<tr>
<td>29. loosely structured;</td>
</tr>
<tr>
<td>30. authentic involvement;</td>
</tr>
<tr>
<td>31. flexible;</td>
</tr>
<tr>
<td>32. unique culture and identity</td>
</tr>
<tr>
<td>33. emphasis upon relationships rather than rules and organisation;</td>
</tr>
<tr>
<td>34. confident “domestication” of state education curriculum and goals;</td>
</tr>
<tr>
<td>35. smart design;</td>
</tr>
<tr>
<td>36. shared vision;</td>
</tr>
<tr>
<td>37. supportive structures and policies;</td>
</tr>
<tr>
<td>38. flexible design for change and innovation;</td>
</tr>
<tr>
<td>39. continual assessment and evaluation of learning community practices/goals;</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>40.</td>
</tr>
<tr>
<td>41.</td>
</tr>
<tr>
<td>42.</td>
</tr>
<tr>
<td>43.</td>
</tr>
<tr>
<td>44.</td>
</tr>
<tr>
<td>45.</td>
</tr>
</tbody>
</table>
Appendix 4: Factors that influence the relationship between educational facilities design and learning

<table>
<thead>
<tr>
<th>symbol</th>
<th>initial code</th>
<th>theme or group code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>physical comfort (eg. ventilation, light, cleanliness)</td>
<td>Personal Comfort (PC)</td>
</tr>
<tr>
<td>A</td>
<td>access (timetabling &amp; mobility) &amp; inclusion</td>
<td>Human Relationships (HR)</td>
</tr>
<tr>
<td>S</td>
<td>space (amount and size) &amp; designated purpose</td>
<td>Space/Storage (S)</td>
</tr>
<tr>
<td>MY</td>
<td>Personal and shared spaces</td>
<td>Human Relationships (HR)</td>
</tr>
<tr>
<td>F</td>
<td>flexible rooms and spaces</td>
<td>Flexibility/Adaptability (F)</td>
</tr>
<tr>
<td>V</td>
<td>variety of work spaces</td>
<td>Flexibility/Adaptability (F)</td>
</tr>
<tr>
<td>D</td>
<td>student displays</td>
<td>Human Relationships (HR)</td>
</tr>
<tr>
<td>#</td>
<td>School Growth - changes and accommodation for size of school</td>
<td>Space/Storage (S)</td>
</tr>
<tr>
<td>S</td>
<td>budget issues, admin &amp; financing facilities</td>
<td>-</td>
</tr>
<tr>
<td>ST</td>
<td>storage</td>
<td>Space/Storage (S)</td>
</tr>
<tr>
<td>IT</td>
<td>Info.Tech - especially integrated</td>
<td>Information Technology (IT)</td>
</tr>
<tr>
<td>GW</td>
<td>group work</td>
<td>Human Relationships (HR)</td>
</tr>
<tr>
<td>DV/ND</td>
<td>distractions (visual, audio, behavioural, issues with acoustics)</td>
<td>Personal Comfort (PC)</td>
</tr>
<tr>
<td>TW</td>
<td>time wasted modifying learning space</td>
<td>Flexibility/Adaptability (F)</td>
</tr>
<tr>
<td>R</td>
<td>Human relationships - community</td>
<td>Human Relationships (HR)</td>
</tr>
<tr>
<td>C/P</td>
<td>curriculum / pedagogy (changes or implementation or practices)</td>
<td>-</td>
</tr>
<tr>
<td>O</td>
<td>outside / active area</td>
<td>Space/Storage (S)</td>
</tr>
</tbody>
</table>
Appendix 5: Learning community characteristics emphasised by Grevillea College

- small size;
- reflective; collaboration;
- participants are members of community;
- participatory; creativity;
- innovation;
- inspiration;
- social networking and support;
- engagement by influencing each other;
- inclusive ‘I’ thinks about ‘we’ and mutual benefit;
- authentic involvement;
- flexible;
- unique culture, shared vision and identity;
- emphasis upon relationships rather than rules and organisation;
- confident “domestication” of state education curriculum and goals;
- supportive structures and policies;
- multiple intelligences;
- communication and responsibility taken and shared
Appendix 6 - Analysis of survey - Grevillea College
The focus of “Great Places for Learning” survey: What makes a great place for learning in your school?

<table>
<thead>
<tr>
<th>Item</th>
<th>Place</th>
<th>% of sample* (N=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best place for learning or best classroom in your school</td>
<td>basketball court + terraced sitting under COLA</td>
<td>32%</td>
</tr>
<tr>
<td>Part of your classroom you most like to use</td>
<td>all of it</td>
<td>21% (mainly girls)</td>
</tr>
<tr>
<td></td>
<td>back of classroom and computers</td>
<td>29% (only boys)</td>
</tr>
<tr>
<td>Part of your classroom you least like to use</td>
<td>front near the board</td>
<td>14% (only boys)</td>
</tr>
<tr>
<td>Things in the classroom that make it difficult to learn</td>
<td>talking/noise at desks (arranged in clusters)</td>
<td>25% (mainly boys)</td>
</tr>
<tr>
<td>Choice of place to work alone</td>
<td>seats in Junior area outdoors</td>
<td>18% (girls)</td>
</tr>
<tr>
<td></td>
<td>library (computers and lounging area)</td>
<td>14%</td>
</tr>
<tr>
<td>Choice of place to work in groups</td>
<td>library (computers, IT equipped classroom and lounging area)</td>
<td>61%</td>
</tr>
<tr>
<td>Working on projects in lunchtime</td>
<td>library (computers, IT equipped classroom)</td>
<td>29%</td>
</tr>
<tr>
<td>Relaxing with students at lunchtime - preference</td>
<td>terrace seating under COLA</td>
<td>36%</td>
</tr>
<tr>
<td>Choice of place for playing games during break</td>
<td>basketball court + terraced sitting under COLA</td>
<td>54%</td>
</tr>
<tr>
<td>Talking quietly with a teacher about your work</td>
<td>Stage 3 classrooms and library lounge area</td>
<td>54%</td>
</tr>
<tr>
<td>Where a student could give a presentation</td>
<td>Stage 3 classrooms</td>
<td>29%</td>
</tr>
</tbody>
</table>

* (N= 28) Boys = 12, Girls = 15, No return on gender = 1
**Appendix 7 - Analysis of survey - Acacia College**

The focus of “Great Places for Learning” survey: what makes a great place for learning in your school?

<table>
<thead>
<tr>
<th>Item</th>
<th>Place</th>
<th>% of sample *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best place for learning (facility) or best classroom in your school</td>
<td>IRC (Independent Research Centre) - including computer loft</td>
<td>30% (no gender difference)</td>
</tr>
<tr>
<td>Part of your classroom you most like to use</td>
<td>computers (in classrooms &amp; IRC loft)</td>
<td>52% (no gender difference)</td>
</tr>
<tr>
<td></td>
<td>Girls did give more returns on quiet, solo or specialist work areas but less than 3/40 for each item</td>
<td></td>
</tr>
<tr>
<td>Part of your classroom you least like to use</td>
<td>my tote tray</td>
<td>18% (no gender difference)</td>
</tr>
<tr>
<td></td>
<td>Gender differences in returns on choice of desks and cupboards - 15% = more boys &amp; 23% = all returns were from girls</td>
<td></td>
</tr>
<tr>
<td>Things in the classroom that make it difficult to learn</td>
<td>other students making noise, general noise</td>
<td>40% (no gender difference)</td>
</tr>
<tr>
<td>Choice of place to work alone</td>
<td>Auditorium</td>
<td>25% (no gender difference)</td>
</tr>
<tr>
<td></td>
<td>IRC had 8/40 returns &amp; 6 returns were from girls = 29% of girls</td>
<td></td>
</tr>
<tr>
<td>Choice of place to work in groups</td>
<td>Auditorium</td>
<td>18% (of 7 returns, 5 were boys = 29% of the boys)</td>
</tr>
<tr>
<td></td>
<td>(Science Lab had 4/40 returns, all returns were from girls = 19% of girls)</td>
<td></td>
</tr>
<tr>
<td>Working on projects in lunchtime</td>
<td>IRC tables</td>
<td>40% (no gender difference)</td>
</tr>
<tr>
<td>Relaxing with students at lunchtime - preference</td>
<td>Amphitheatre (COLA + hard playing surfaces outside C Block in Junior area of school) &amp; [shade sails on oval near hardcourts]</td>
<td>45% (no gender difference)</td>
</tr>
<tr>
<td></td>
<td>[30% no gender difference]</td>
<td></td>
</tr>
<tr>
<td>Choice of place for playing games during break</td>
<td>Hardcourts</td>
<td>50% (no gender difference)</td>
</tr>
<tr>
<td>Talking quietly with a teacher about your work</td>
<td>Nest of student desks near bank of computers in corner of classroom</td>
<td>43% (no gender difference)</td>
</tr>
<tr>
<td>Where a student could give a presentation</td>
<td>Open section of classroom surrounded by student desks - double classroom with operable doors open</td>
<td>30% (no gender difference)</td>
</tr>
</tbody>
</table>

* (N= 40) Boys = 17 Girls = 21 No return on gender = 2
Appendix 8 - Information sheet for school

University of Wollongong

Doctoral Research Project: The Cultural Architecture of Schools
An investigation of the relationship between school design, the learning environment and learning communities in new schools.

Project Design:

- Survey of documents (such as school’s website, parent handbooks, architectural plans, curriculum outlines and policy statements, learning goals and philosophy) that describe the educational vision and architectural design of the school.

- This data is explored through semi-structured interviews with the leadership team and architects (30 minute maximum audio recorded or email).

- Interested staff can participate in brief semi-structured interviews, focusing on aspects covered in the workshop like “What makes a great learning space? Why?”. Participation is voluntary with consent from the participating staff. These interviews will be conducted by email and can involve any teacher.

- Researcher conducted field observations conducted over the days allocated for the study, with a focus on watching the use of spaces throughout the day and site occupation evaluation. Researcher is passive observer. Photographs of learning spaces and how the spaces are used may incidentally include people but I will ensure the people cannot be identified. The photographs need to show some areas used by the students who will participating in “Great Places for Learning” activity (see below). Researcher needs to meet with the teacher(s) of these class(es). Alternately, one head teacher can fulfil the role of co-ordinating the student participation.

- Class groups of students supervised by staff (less than 100 students from Stage 3 or Stage 4 and their teachers) participate in a 20 minute “Great Places for Learning” activity conducted in an interactive setting.

The activity (conducted in roll or home classes) involves students and staff looking at a display of photographs of their school buildings and learning spaces and giving anonymous written responses to a number of open questions about their experiences of the built environment from the perspective of learners. This activity is conducted on the same days as site observations. Parents will be informed of this activity through a newsletter describing the research project.
Parents and staff will be able to give negative consent for this activity. No sensitive information will be collected during this activity.

The same photographic display will be set up for staff in a common area, so they can respond to the survey.

Optional participation – Participant Generated Photographs:

- Students can voluntarily participate in an activity whereby they either draw or photograph places that capture elements of learning spaces (students are given prompts like “If you had to work with a group of students, describe or show your idea of an ideal space for doing this group work.”). Students are free to collect or create these images at any time convenient to them. These responses can be emailed or I can arrange collection. Students collect specific consent and information sheets for this activity. Information sheets and the activity sheet is issued to survey students via class teacher(s) on first visit.

Timeline for collecting data collection at the case study school.

1. Visit #1 - Orientation visit to school.
   Photograph aspects of learning spaces (images to be used in student/staff activities), conduct some observations of site, collect documents such as maps/floor plans of educational facilities and curriculum outlines/policies. Familiarise myself with site.

   Meet with either teachers of students who will be participating in “Great Places” activities or co-ordinating teacher. I will be able to leave information sheets and handouts with that teacher, for distribution to students before Visit #2.

   I will also collect email addresses for staff or group address for distributing interview questions before second visit.

   Time required: less than one day

2. Visit #2 (two weeks after first visit).
   Conduct “Great Places for Learning” activity with case study students and staff.

   Conduct audio-recorded interviews with principal and property manager. Researcher completes site observations.

   Collect any returns for student generated photographs/images.
Time required: one day (can be divided over two half day visits)

In 2009, the days that are most suitable for the research are Mondays and Fridays, but other days can be arranged to best suit the availability of the participants.
Appendix 9 - Information sheet for principals/business managers

LETTER TO SCHOOL PRINCIPAL/BUSINESS MANAGER

Dear ………………

Thank you for agreeing to participate in a study, called An investigation of the relationship between school design, the learning environment and learning communities in new schools to be conducted by myself through the University of Wollongong. I am currently working on a doctorate under the supervision of Associate Professor Narottam Bhindi (nbhindii@uow.edu.au) and Professor Jan Wright (jwright@uow.edu.au). This project involves two schools as case studies, and will provide the main data for my doctoral thesis.

The purpose of this research is to investigate the relationship between school design, the learning environment and learning communities in new schools. The project will explore the ways in which the design of physical space and the creation of a learning culture are negotiated.

Aims of the research project:
1. To investigate the process and procedures for developing educational facilities.
2. To identify the educational vision of each case study school and its relationship to the design of the learning environment.
3. To investigate the roles leadership, architects and management play in the process and design of educational facilities.
4. To investigate responses of staff and students to the current educational facilities, and explore ways in which these perspectives can be used in the planning and design of an effective learning community.
5. To explore the use of pattern languages for negotiating the design of physical space and the creation of a learning culture within a school.

Project Outcomes:
1. Collect data for doctoral thesis and publications in academic and professional journals.
2. Provide a summary for the school’s senior executive covering the findings of my investigations.

Structure for Data Collection
I propose Term 4, 2008 for data collection involving site observations, staff and students. The timing within Term 4 is flexible and I will be able to accommodate any dates that best suit the schools from Weeks 1 to 7. The data collection phase should take 3 - 4 days spread over 2 or 3 separate visits to the school. My research design, methodology and human research ethics will be thoroughly supervised and assessed by the university before I commence data collection.

Structure of the study -
- Survey of documents (such as school’s website, parent handbooks, architectural plans) that describe the educational vision and architectural design of the school.
- This data is clarified through semi-structured interviews with the leadership team and architects (30 minute maximum audio recorded or email).
- Researcher conducted field observations conducted over the days allocated for the study, with a focus on watching the use of spaces throughout the day and site evaluation. Researcher is passive observer. Photographs of learning spaces and how the spaces are used might include people but I will ensure the people cannot be identified.

- Roll groups of students supervised by staff (students from either Stage 3 or Stage 4 and their teachers) participate in a 20 minute activity conducted in an interactive setting. The activity (conducted in roll classes) involves students and staff giving anonymous written responses to a number of open questions about their experiences of the built environment from the perspective of learners and describe/draw what makes a great place to learn. Activity conducted on the same days as site observations.

Optional follow-up participation:
- After the interactive activity, interested students or classes like Design & Technology or Visual Arts can voluntarily follow up with an activity whereby they either draw or photograph places that capture elements of learning spaces (students are given prompts like “If you had to work with a group of students, describe or show your idea of an ideal space for doing this group work.”). Students are free to collect or create these images at any time convenient to them. These responses can be emailed or I will arrange collection. Students collect separate consent and information sheets for this activity.

- Interested staff can participate in brief semi-structured interviews, focusing on aspects covered in the workshop like “What makes a great learning space? Why?”.

Timeline – Term 4, 2008:
1. Orientation visit to school – meet staff, photograph aspects of learning spaces (images used in student/staff workshops), conduct some observations of site, collect documents such as maps/floor plans of educational facilities. Familiarise myself with site. One day.
2. Two day visit (two weeks after orientation visit) – conduct activity with case study staff and students. Conduct interviews with principal, property manager and staff. Researcher completes site observations.
3. Students and staff generated images – collection arranged two weeks later.

Signed Consent:
Please find attached a consent form, giving permission for the school to be one of my cases in this project. I have also attached to this letter copies of the Participant Information Sheets for the teachers, children and parents/caregivers.

I would also like to conduct 30 minute (maximum) interviews with yourselves and the architects. The purpose of these interviews will be to explore your roles in the design process and clarify information gleaned from the document survey. Apart from 30 minutes of your time for the interview, I can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time. If you decide to stop participating, any information you have given will not be used.

If there are any ethical concerns you can contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong on (02) 42214457.

Should you require any further information please do not hesitate to contact me.

Thank you for your interest in this study.

Kate Bertram
EdD Research Student
Faculty of Education
kib974@uow.edu.au
Appendix 10 - Information sheet for teacher participants

PARTICIPATION INFORMATION SHEET FOR TEACHERS

TITLE: An investigation of the relationship between school design, the learning environment and learning communities in new schools.

PURPOSE OF THE RESEARCH: This is an invitation to participate in a doctoral research project conducted by a research student at the University of Wollongong. Kate Bertram is currently working on a doctorate under the supervision of Associate Professor Narottam Bhindi (nbhind@uow.edu.au) and Professor Jan Wright (jwright@uow.edu.au). This project involves two schools as case studies, and will provide the main data for Kate’s doctoral thesis.

The purpose of this research is to investigate the relationship between school design, the learning environment and learning communities in new schools. The project will explore the ways in which the design of physical space and the creation of a learning culture are negotiated. As you are probably aware, schools are constantly considering the design and construction of new educational facilities. This study is both helpful for future planning at the school and for teachers considering the use of space as a resource in their current teaching programmes.

INVESTIGATOR
Mrs Kate Bertram
EdD Research Student
Faculty of Education
klb974@uow.edu.au

METHOD AND DEMANDS ON PARTICIPANTS
If you choose to be included, you will have the choice of being involved in one or two research activities. Staff and students will be invited to respond to a structured written questionnaire (less than 20 minutes to complete). You will also be invited to collect two photographs of the school buildings/architecture that represent your responses to two questions. Typical questions include: Identify your favourite space or place in the school. Where do you like to work by yourself? You will be asked to annotate your photographs and locate them on a map of the school. These photographs can be taken at any time of the day during the next two weeks.

You may be asked to participate in a follow-up semi-structured interview. The purpose of the interview is to explore your responses in greater detail. An interview would take 20 minutes and will be audio recorded.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Apart from the 60 minutes (if you participate in all activities) of your time, I can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. Refusal to participate in the study will not affect your relationship with the University of Wollongong or the investigator.

BENEFITS OF THE RESEARCH
Findings from the study will be summarized for the benefit of the school, with the purpose of supporting future stages of growth and development at your school. Findings will also be included in a doctoral, as well as publications in academic and professional journals. Confidentiality is assured. The school and participants will not be identified in any part of the research.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UoW Ethics Officer on (02) 4221 4457.

Thank you for your interest in this study.
Appendix 11 - Information sheet for student participants

PARTICIPATION INFORMATION SHEET FOR STUDENTS

Dear student,

This is an invitation to participate in a study, called An investigation of the relationship between school design, the learning environment and learning communities in new schools to be conducted by a research student at the University of Wollongong. Mrs Bertram is currently working on a doctorate under the supervision of Associate Professor Narottam Bhindi (nbhind@uow.edu.au) and Professor Jan Wright (jwright@uow.edu.au). This project involves two schools as case studies, and will provide the main data for Kate's doctoral thesis.

The purpose of this research is to investigate the relationship between school design, the learning environment and learning communities in new schools. The project will explore the ways in which the design of physical space and the creation of a learning culture are negotiated.

INVESTIGATOR
Mrs Kate Bertram
EdD Research Student
Faculty of Education
klb974@uow.edu.au

WHAT I WOULD LIKE YOU TO DO
If you choose to be included, you will be asked to collect two photographs or drawn pictures/diagrams of the school buildings/architecture that best represent your responses to two questions. Typical questions include: Identify your favourite space or place in the school. Where do you like to work by yourself? 20 minutes is all that is need for completing this activity. You will be asked to annotate your photographs/images with written comments and locate them on a map of the school. These photographs will be taken during the next two weeks with the assistance of your class teacher. The photographs will not include people.

Apart from 20 minutes needed for completing the activity, I can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time. If you decide to stop participating, any information you have given will not be used.

If you decide to help me in this study, you will provide me with valuable information about how school design affects the way students work and learn. A report of the case study findings will be provided to the School Executive but we will not use your name in any part of the research. Findings will also be published in my thesis, as well as publications in academic and professional journals. But again, I will not use your name in any part of the research findings.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you are not happy with the way this research has been conducted, you can tell your parents or the teacher who can contact the Ethics Officer at the University on (02) 42214457.

Thank you for your interest in this study.
Appendix 12 - Information sheet for parents/caregivers of student participants

LETTER OF INFORMATION TO PARENTS/CAREGIVER

Dear Parent/caregiver

Your child has been invited to participate in a study, called An investigation of the relationship between school design, the learning environment and learning communities in new schools to be conducted by a research student at the University of Wollongong. Mrs Bertram is currently working on a doctorate under the supervision of Associate Professor Narottam Bhindi (nbhind@uow.edu.au) and Professor Jan Wright (jwright@uow.edu.au). This project involves two schools as case studies, and will provide the main data for Kate’s doctoral thesis.

The purpose of this research is to investigate the relationship between school design, the learning environment and learning communities in new schools. The project will explore the ways in which the design of physical space and the creation of a learning culture are negotiated.

INVESTIGATOR
Mrs Kate Bertram
EdD Research Student
Faculty of Education
klb974@uow.edu.au

WHAT I WOULD LIKE THE STUDENTS TO DO
Students will be asked to collect two photographs or draw two pictures/diagrams of the school buildings/architecture that best represent their personal responses to two questions. Typical questions include: Identify your favourite space or place in the school. Where do you like to work by yourself? The participant will be asked to annotate the photographs and locate them on a map of the school. 20 minutes is all that is need for completing this activity. These photographs will be taken during the next two weeks with the assistance of the student’s class teacher. The photographs will not include people.

Apart from 20 minutes of their time, I can foresee no risks for students. Your child’s involvement in the study is voluntary and you may withdraw their participation from the study at any time. If they stop participating, any information they have given will not be used.

If your child decides to help me in this study, they will provide me with valuable information about how school design affects the way students work and learn. Findings of this case study will be provided to the School Board but I will not use their name in any part of the research. Findings will be published in a thesis, as well as publications in academic and professional journals. But again, I will not use their name in any part of the research findings.

Parents will need to sign a consent form before a student can participate in this study.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you are not happy with the way this research has been conducted, please contact the Ethics Officer at the University on (02) 42214457.

Thank you for your interest in this study.
PARTICIPATION INFORMATION SHEET FOR ARCHITECTS

TITLE: An investigation of the relationship between school design, the learning environment and learning communities in new schools

PURPOSE OF THE RESEARCH: This is a study conducted by a research student at the University of Wollongong. Kate Bertram is currently working on a doctorate under the supervision of Associate Professor Narottam Bhindi (nbhindli@uow.edu.au) and Professor Jan Wright (jwright@uow.edu.au). This project involves two schools as case studies, and will provide the main data for my doctoral thesis. As consulting architect(s) for (name of school) ……………………………………, you are invited to participate in this case study.

The purpose of this research is to investigate the relationship between school design, the learning environment and learning communities in new schools. The project will explore the ways in which the design of physical space and the creation of a learning culture are negotiated. This study will be helpful for future planning of educational facilities at the schools involved.

INVESTIGATOR
Mrs Kate Bertram
EdD Research Student
Faculty of Education
klb974@uow.edu.au

METHOD AND DEMANDS ON PARTICIPANTS
If you choose to be included, you will be asked to participate in a 30 minute (maximum) interview in person or by email. The purpose of the interview is to explore the process and procedures used in the planning and design of new educational facilities.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Apart from the 30 minutes of your time, I can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. Refusal to participate in the study will not affect your relationship with the University of Wollongong or the investigator.

BENEFITS OF THE RESEARCH
Findings from the study will be summarized for the benefit of the school, with the purpose of supporting the work of designing any future growth at (name of school) ……………………………………. Findings will also be published in my thesis, as well as publications in academic and professional journals. Confidentiality is assured. The school and participants will not be identified in any part of the research.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UoW Ethics Officer on (02) 4221 4457.

Thank you for your interest in this study.
Appendix 14 - Consent form for school

Consent Form for School (defined as staff, students and parents) to be a Case Study

**Title of Research Project:** An investigation of the relationship between school design, the learning environment and learning communities in new schools.

**Researcher's Name:** Mrs Kate Bertram

I have been given information about *An investigation of the relationship between school design, the learning environment and learning communities in new schools.* and discussed the research project with Kate, who is conducting this research as part of Doctor of Education supervised by Associate Professor Narottam Bhindi and Professor Jan Wright in the Department of Education at the University of Wollongong.

I have been advised of the potential risks and burdens associated with this research, and have had an opportunity to ask Kate any questions I may have about the research and the participation of the school as a case study. I understand that participation in this research is voluntary.

If I have any further enquiries about the research, I can contact Kate Bertram by telephone (4257 1171) or by email (klb974@uow.edu.au) or her supervisors, Prof. Jan Wright (jwright@uow.edu.au) and Assoc.Prof. Narottam Bhindi (nbhindi@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 4457.

By signing below I am giving consent to the participation of ______________________ (name of school) in the research project entitled: *An investigation of the relationship between school design, the learning environment and learning communities in new schools.*

I understand that findings of this research project will be used for a thesis, an article and possibly other published studies or presentations and I consent for it to be used in this manner.

Signed Date

.........................................................  ........../....../......

Name (please print)

.........................................................

Principal

Name of School (please print)

.........................................................

Please sign and return to Kate Bertram (address supplied)

Thank you.
Appendix 15 - Consent form for staff

Consent Form for Staff

Title of Research Project: An investigation of the relationship between school design, the learning environment and learning communities in new schools.

Researcher’s Name: Mrs Kate Bertram

I have been given information about An investigation of the relationship between school design, the learning environment and learning communities in new schools and discussed the research project with Kate, who is conducting this research as part of Doctor of Education supervised by Associate Professor Narottam Bhindi and Professor Jan Wright in the Department of Education at the University of Wollongong.

I have been advised of the potential risks and burdens associated with this research, and have had an opportunity to ask Kate any questions I may have about the research and my participation.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my relationship with the researcher, the school or the University of Wollongong.

If I have any enquiries about the research, I can contact Kate Bertram by telephone (4257 1171) or by email (klb974@uow.edu.au) or her supervisors, Prof. Jan Wright (jwright@uow.edu.au) and Assoc.Prof. Narottam Bhindi (nbhindi@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 4457.

By signing below I am consenting to:

- Participating in the collection of photographs or drawn images of school buildings.
- Participating in a questionnaire (same as students’ questionnaire – less than 20 minutes).
- Participating in one audio recorded semi-structured interview for 20 minutes with the researcher.
- Having my images/photographs and comments taken for inclusion in the study’s findings. (The photographs I take will only be of buildings and not of me or other people.)
- My photograph being taken in the context of the built environment (to be used as illustrations for article and/or presentation).

I understand that information from me will be used for a thesis, as well as publications in academic and professional journals, and I consent for it to be used in this manner.

I am consenting to (please tick):

- Participating in the collection of photographs of the school buildings.
- Participating in a questionnaire (same as students’ questionnaire – less than 20 minutes).
- Participating in one audio recorded interview for 20 minutes with the researcher.
- Having my photographs and comments taken for inclusion in the study’s findings.

-----------------------------------------------------------------------------------------------------------------
☐ My photograph being taken in the context of the built environment (to be used as illustrations for article and/or presentation).

Signed

..................................................................

Date

..........................................................  ....../....../......

Name (please print)

..........................................................
Appendix 16 - Consent form for students

University of Wollongong

Consent Form for School Students

Title of Research Project: An investigation of the relationship between school design, the learning environment and learning communities in new schools.

Researcher's Name: Mrs Kate Bertram

I have read the participation information sheet and have had the opportunity to ask the researcher any further questions I may have had. I understand that my participation in this research is voluntary and I may withdraw at any time from the study without affecting my treatment at school in any way.

I understand that the risks to me are minimal in this study and have read the information sheet and asked any questions I may have about the risks. I understand that I will be asked to collect two photographs or draw two images/diagrams of the school buildings/architecture that best represent your responses to two questions. I will be asked to annotate my photographs and locate them on a map of the school. The photographs will not include people. I understand my name will not be used to identify my comments or photographs in the study.

If I have any concerns or complaints regarding the way the research is or has been conducted I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 4457.

By signing below I am consenting to:

• Participating in the collection of photographs of the school buildings.
• Having my photographs/drawn images and comments taken for inclusion in the study’s findings. (The photographs will only be of buildings and not of me or other people.)

I understand that information from me will be used for a thesis, as well as publications in academic and professional journals, and I consent for it to be used in this manner.

-----------------------------------------------------------------------------------------------------------------------------------------

I give permission for my child _________________________________ (please insert your child’s name) to participate in this research.

I am consenting to my child (please tick):

☑ Participating in the collection of photographs or drawn images of the school buildings.
☐ Having his/her photographs, drawings and comments taken for inclusion in the study’s findings.

Parent/ Guardian Signature _________________________________________
Name (please print) _____________________________________________
Date _____________________

Student’s signature _____________________________________________
Appendix 17 - Consent form for architects/principal/business manager

Consent Form for Architects/Principal/Business Manager

Title of Research Project: An investigation of the relationship between school design, the learning environment and learning communities in new schools.

Researcher’s Name: Mrs Kate Bertram

I have been given information about An investigation of the relationship between school design, the learning environment and learning communities in new schools. and discussed the research project with Kate, who is conducting this research as part of Doctor of Education supervised by Associate Professor Narottam Bhindi and Professor Jan Wright in the Department of Education at the University of Wollongong.

I have been advised of the potential risks and burdens associated with this research, and have had an opportunity to ask Kate any questions I may have about the research and my participation.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my relationship with the researcher, the school or the University of Wollongong.

If I have any enquiries about the research, I can contact Kate Bertram by telephone (4257 1171) or by email (klb974@uow.edu.au) or her supervisors, Prof. Jan Wright (jwright@uow.edu.au) and Assoc.Prof. Narottam Bhindi (nbhindi@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 4457.

By signing below I am consenting to:

- Participating in one audio recorded or email interview for 30 minutes.
- Access to architectural plans and drawings relating to the school.
- My photograph being taken in the context of the built environment (to be used as illustrations for article and/or presentation).

I understand that information from me will be used for a thesis, as well as publications in academic and professional journals, and I consent for it to be used in this manner.

----------------------------------------------------------------------------------------------------------------

I am consenting to (please tick):

- ☐ Participating in one audio recorded or email interview for 30 minutes.
- ☐ Access to architectural plans and drawings relating to the school.
- ☐ My photograph being taken in the context of the built environment (to be used as illustrations for article and/or presentation).

Signed       Date
.......................................................................  ......./....../......

Name (please print): ...............................................
Name of school (please print): ...............................................

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Appendix 18 - Consent form for school

Consent Form for School (defined as staff, students and parents) to be a Case Study

Title of Research Project: An investigation of educational facilities planning and design in the context of learning communities.

Researcher’s Name: Mrs Kate Bertram

I have been given information about An investigation of educational facilities planning and design in the context of learning communities and discussed the research project with Kate, who is conducting this research as part of Doctor of Education supervised by Associate Professor Narottam Bhindi and Professor Jan Wright in the Department of Education at the University of Wollongong.

I have been advised of the potential risks and burdens associated with this research, and have had an opportunity to ask Kate any questions I may have about the research and the participation of the school as a case study. I understand that participation in this research is voluntary.

If I have any further enquiries about the research, I can contact Kate Bertram by telephone (4257 1171) or by email (klb974@uow.edu.au) or her supervisors, Prof. Jan Wright (jwright@uow.edu.au) and Assoc.Prof. Narottam Bhindi (nbhind@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 4457.

By signing below I am giving consent to the participation of ________________________ (name of school) in the research project entitled: An investigation of educational facilities planning and design in the context of learning communities.

I understand that findings of this research project will be used for a thesis, an article and possibly other published studies or presentations and I consent for it to be used in this manner.

Signed       Date
.......................................................................  ......./....../......

Name (please print) ...........................................................................

Principal

Name of School (please print) ...........................................................................
Appendix 19 - Schedule of data collection

<table>
<thead>
<tr>
<th>Case study school</th>
<th>Documentation sent to college</th>
<th>Site visits and researcher observations</th>
<th>Interviews</th>
<th>Questionnaire or Participant Generated Photographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacaranda College</td>
<td>June 2007</td>
<td>Term 4, 2007 (November - December)</td>
<td>November 2007 - Principal, Head of Campus, Property Manager, Architect, two senior students, one teacher</td>
<td>November 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Term 1, 2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grevillea College</td>
<td>July 2008</td>
<td>Term 4, 2008 (November - December)</td>
<td>27 &amp; 28 November 2008 - Principal, Head of Middle School, Bursar, four Middle School teachers</td>
<td>27 November 2008</td>
</tr>
</tbody>
</table>

Appendix 20 - Participation in each data collection activity

<table>
<thead>
<tr>
<th>Data collection</th>
<th>Jacaranda College</th>
<th>Grevillea College</th>
<th>Acacia College</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews</td>
<td>5</td>
<td>7</td>
<td>7 #</td>
<td>19</td>
</tr>
<tr>
<td>Questionnaire or Participant Generated Photographs</td>
<td>7 teachers and 5 students *</td>
<td>32</td>
<td>40</td>
<td>84</td>
</tr>
<tr>
<td>Researcher Generated Photographs</td>
<td>109</td>
<td>106</td>
<td>116</td>
<td>331</td>
</tr>
</tbody>
</table>
Appendix 21 - Checklist for school visits

Participating School: ___________
College contact: ___________
Class/student contact: ___________

Visit #1 -

1. Document survey – copies to be collected in either soft or hard versions:
   - school map
   - architectural plans/concept sketches
   - timetable that shows class and room usage for week/cycle
   - curriculum outlines and preambles
   - parent handbook
   - enrolment package/prospectus

2. Orientation tour of facilities – with a guide or alone with a map
   - match map with the real thing
   - identify buildings’ functions
   - identify who uses each space (eg. classes, subjects)
   - orientation of buildings to grounds and overall site plan
   - interaction between learning spaces and play spaces

3. Deliver of information and consent forms - to be collected on next visit
   - consent from the school – from Principal (sent with mail-out)
   - info forms for staff email interviews (collect email addresses or group mailing address)
   - info & consent forms for Principal, Business Manager interviews
   - newsletter for students who will be involved in “Great Places for Learning” activities.

4. Photographs (keep image log) of buildings and facilities
   - using Educational Facilities Effectiveness Instrument (EFEI) criterion
   - using “modes of learning” language
   - using “Architecture of Achievement” principles
   - using “Design for Play” principles

5. Preparation for Visit #2

   - leave schedule of interviews to be organised for next visit
   - organise location and time for the interactive “Great Places for Learning”
   - leave PGP forms for class teacher and newsletter for workshops
Visit #2

1. “Great Places for Learning” activity:
   - set up spaces with photographs of learning spaces taken on Visit #1 (can be in two places – one for staff and one for the students)
   - students and staff complete survey based on the photographic display
   - collect any completed Participant Generated Photographs

2. Option 1 for Interviews - audio taped during the visit
   - Principal
   - Business Manager

Option 2 for Interviews - to be conducted by email during the following week
   - Principal
   - Business Manager

Staff interviews have been distributed by email.

3. Field Observations by researcher -
   - passive observer in range of key learning spaces

4. Consent Forms - collect complete and signed forms
   - Principal
   - School as Case Study
   - Business Manager
   - students submitting photographs
   - Interested staff

Schedule of Interviews

Option 1 for Interviews - audio taped during the researcher’s second visit

- Principal Time: ________ Date: _______ Location: ________
- Business Manager Time: ________ Date: _______ Location: ________
- Head of Middle School Time: ________ Date: _______ Location: ________
- Interested staff
  Name: ________ Time: ________ Date: _______ Location: __________
  Name: ________ Time: ________ Date: _______ Location: __________
  Name: ________ Time: ________ Date: _______ Location: __________

Option 2 for Interviews - to be conducted by email during the following week

- Principal
- Business Manager
- Head of Middle School
- Interested staff
Interactive photographic survey - “Great Places for Learning”

Date: ______ Location: ____________ Time: __________

Participating Classes: ______________________________________

Participating Staff: _________________________________________

Many thanks for your assistance and support.

Kate Bertram
Appendix 22 - Principal interview

Interview with Principal
Conducted by Kate Bertram

An investigation of educational facilities planning and design process in the context of learning communities

1. Identify the triggers for the decision “it is time to build”?

2. Who is involved in initiating the planning/design process?

3. On a scale of 1 to 10 (10 being the most and 1 being the least), how important is it for a principal to be involved in the entire design and planning process? Explain your response.

4. Describe the role you, as Principal of this school, play in the process and the type of information you provide to a design team. Generally speaking, is this the role you think a principal should take? From a personal point of view, is this the role you think you should take?

5. Do you think architects and builders understand the information you supply? Do you think architects and builders use the information you supply?

6. How can a leader offer leadership to the design process?

7. How can a leader offer leadership to the utilisation of facilities and problem solving in relation to later occupancy habits?

8. Are your educational views and philosophies manifest in the educational facilities at _______? Are the school's educational views and philosophies manifest in the educational facilities at _______?
An investigation of educational facilities planning and design process in the context of learning communities

1. Identify the factors that trigger the decision “it is time to build”.

2. Who is involved in initiating the planning/design process?
   Do the same people drive the project from beginning to end?
   Does any one person or role lead the building programme?

3. On a scale of 1 to 10 (10 being the most and 1 being the least), how important is it for a Head of Campus to be involved in the entire design and planning process, from initial discussions through to occupancy?

4. Do you think architects and builders understand the information you supply?
   Do you think architects and builders use the information you supply?

5. In your opinion, are your personal educational views and philosophies present in the design of educational facilities at Tongarra?
Appendix 24 - Property Manager Interview

Interview with College/Property Manager
Conducted by Kate Bertram

An investigation of educational facilities planning and design process in the context of learning communities

1. Identify the factors that trigger the decision “it is time to build”.

2. Who is involved in initiating the planning/design process?
   Do the same people drive the project from beginning to end?
   Does any one person or role lead the building programme?
   Describe your own role in the planning and building process.

3. On a scale of 1 to 10 (10 being the most and 1 being the least), how important is it for a principal to be involved in the entire design and planning process, from initial discussions through to occupancy?

4. In your opinion, name the greatest hindrance/blocker in the process of designing and planning educational facilities.

5. For the planning process and design to be successful, can you name two or three conditions, mechanisms or factors that must be present?
Appendix 25 - Student Interview

Interview with Year 11 students
Follow-up to Participant generated images
5/12/07
Conducted by Kate Bertram

An investigation of educational facilities planning and design process in the context of learning communities

Interview and conversation is held in context of the photographs these students took and the comments they made on the data collection sheet. The photographs and sheets were on the table during the interview, so reference could be made to the visual and help students remember their written comments.

1. ---- - can you explain a little bit more this feeling of being “trapped”?

2. So, physical comfort is obviously really important to feeling settled for work? We all taught about it but don’t always provide it, so can you give me an idea of your ultimate comfortable working space?

3. Are there any other comfort factors from a student’s point of view makes for a comfortable learning environment?

4. Looking at ----’s images - the first one of the frog pond. Can you talk me through what aspects are relaxing?

5. Looking at ---’s image #2. Could you talk me through this space, what do you particularly like about it. You described the restrictions but if you worked in there independently, what makes this space really appealing to you?
Appendix 26 - Interview questions

Research Project: An investigation of the relationship between school design, the learning environment and learning communities in new schools.

Interview questions for semi-structured interviews with school executive. These questions are used as prompts and to stimulate responses. The researcher will follow ideas suggested in responses given.

Photographs were taken by researcher and displayed for questionnaire activity. Photographs would be available for interviews.

Principal - Questions 1-9
Business Manager - Questions 1, 2, 5, 6, 8, 9
Head of School - Questions 5 - 9 + priority lists for teachers

1. Tell me about factors that tend to trigger the decision “it is time to build”.

2. Who is usually involved in initiating a planning/design process?

3. How do you convey your educational goals to people responsible for building the college facilities?

4. How can you help staff utilise the facilities to support their teaching practices?

5. Tell me about whether or not it is difficult to build and create great places to learn.

6. Would you be able to describe your favourite place for learning in the college? Is it in any of the photographs I have taken?

7. What is your idea of a great place to learn? Is it in the photographs?

8. What do you think matters the most to teachers in terms of classrooms and facilities?

9. What do you think matters the most to students in terms of classrooms and facilities?

Interview questions for semi-structured interviews with teachers. These questions are used as prompts and to stimulate responses. The researcher will follow ideas suggested in responses given.

Photographs were taken by researcher and displayed for questionnaire activity. Photographs would be available for interviews.

1. Would you be able to describe your favourite place for learning in the school? Is there a photograph on display that showed this space?
2. What is your idea of a great place to learn? Can you give it a descriptive name or label?

3. What do you think matters the most to teachers in terms of classrooms and facilities design?

4. What do you think matters the most to students in terms of classrooms and facilities design?

5. Is there a teaching space you would love to see changed? Was it shown in any of the photographs on display?

6. How would you change this space? Why?

7. Show the teacher the following lists.

   If you had to choose a room or teaching space, choose the 5 things this learning space must have. Prioritise your choices, with 1 being the most important.

   Describe the lesson or class you would typically teach in this room/space (eg. Year 10 English class of 26 students):

   _ one computer per student (networked)
   _ integrated IT equipment for “from the front” presentations (eg. data projector, smartboard)
   _ lighting (consistent, bright, controllable)
   _ specialist fit-out (eg. laboratory, kiln & ceramics equipment)
   _ Ventilation and temperature control
   _ indoor/outdoor connection through doors and windows
   _ large space (greater than 80 square metres)
   _ variety of work spaces within the room/area
   _ individual desks/chairs
   _ soft seating area
   _ communal worktables
   _ visually and acoustically separated from other learning spaces/classrooms
   _ display boards and cupboards
   _ carpet
   _ hard floor surface
   _ connected to other classrooms (eg. flexible walls, immediate access via door or windows)
   _ internet access for all students
   _ storage for students’ materials
Choose the 5 things your own personal work/preparation space must have. Prioritise your choices, with 1 being the most important.

Describe work you usually complete (eg. Secondary Mathematics teaching):

- one computer per staff member (networked)
- integrated IT equipment for presentations and meetings (eg. data projector, smartboard)
- lighting (consistent, bright, controllable)
- specialist fit-out (eg. laboratory, kiln & ceramics equipment)
- Ventilation and temperature control
- indoor/outdoor connection through doors and windows
- variety of work spaces within the room/area
- individual desks/chairs/storage for each teacher
- soft seating area
- kitchenette facilities
- communal worktables
- visually and acoustically separated from other learning spaces/staffrooms
- connected to or in close proximity to library/resource centre
- connected to or in close proximity to administration office
- display boards
- carpet
- hard floor surface
- internet access
- storage for personal and teaching materials
- specific work station or area for each teacher
- photocopier/printers in room
Appendix 27 - JL interview

Interview with JL

1. Where did the ideas for the original design originate? What influence the design decisions?

2. Where there any aspects in the design that particularly responded to emerging teaching and learning practices? Aspects that responded to contemporary pedagogy?

3. What were the goals or purpose of the design concept?

4. Who contributed to the development of this design?

5. From your perspective, were these “pods” successful in achieving the goals/purpose?

6. Has the ideal use of these buildings been affected by pressures within growing schools?

7. From your perspective ten years on, does this design respond to the current educational demands? Is it currently used to respond to contemporary educational trends?
Appendix 28 - Architect interview

Research Project: An investigation of the relationship between school design, the learning environment and learning communities in new schools.

Interviewee: ______________ Architects
Interviewer: Kate Bertram (katebertram@me.com)

1. In your experience, do architects understand the types of educational facilities client schools want and that school’s educational vision?

2. What have you found to be the greatest hindrance/blocker in the process of designing educational facilities for a client school?

3. Would you be able to describe your favourite place for learning in any of the case study schools? Is it in any of the photographs I have taken?

4. What is your idea of a great place to learn? Idea of the ideal 21st century classroom?

5. What do you think matters the most to teachers in terms of classrooms and facilities?

6. What do you think matters the most to students in terms of classrooms and facilities?

7. In what ways can physical educational facilities influence teaching and learning?

8. In what ways can physical educational facilities influence the experiences of those who work within these facilities?

9. In what ways can physical educational facilities influence the creation of community?

10. If these influences exist, could you describe the key features or elements of building design that promote or allow for this influence?

11. Are any of these elements present in the case studies? Examples that demonstrate these elements and features in theory? in action?

12. In your experience, what type of approach should be taken to ensure these elements are present in the design?

13. Are there key requirements for a functioning learning space? for an optimum learning space?

14. In your view, is there such a thing as a learning culture, and can a building communicate it in the physical design/spaces?

15. How do buildings create human spaces?

16. Is there a link between physical structures and peoples’ sense of belonging to that space? Does this vary for children? for young people?
Appendix 29 - Participant Generated Photographs

Investigating educational facilities planning and design in the context of learning communities

Case Study of __________

Participant Generated Photographs of the Built Environment/School Facilities

Name of participant: _______________________ Staff ☐ Student ☐

Instructions: You are looking for images of the campus’ educational facilities and buildings. Do not photograph people. Instead, focus upon the physical space and buildings. Take a photograph that responds to the following:

Where do you like to work alone? 
or
Where would you like to work alone?

Image # 1: _________________________________________ (caption for your image)

1. Glue your image here and label with a caption.
2. Mark the location on the attached map.
3. Add your comments or explanation below. You may choose to go over the page and use diagrams or sketches to explain your meaning.

Investigating educational facilities planning and design in the context of learning communities

Case Study of __________

Participant Generated Photographs of the Built Environment/School Facilities

Name of participant: _______________________ Staff ☐ Student ☐

Instructions: You are looking for images of the campus’ educational facilities and buildings. Do not photograph people. Instead, focus upon the physical space and buildings. Take a photograph that responds to the following:

Where do you like to work on group projects? 
or
Where would you like to work on group projects?

Image # 2: _________________________________________ (caption for your image)

1. Glue your image here and label with a caption.
2. Mark the location on the attached map.
3. Add your comments or explanation below. You may choose to go over the page and use diagrams or sketches to explain your meaning.
Investigating educational facilities planning and design in the context of learning communities
Case Study of _____________

Participant Generated Photographs of the Built Environment/School Facilities

Name of participant: _______________________ Staff  ☑ Student  ☑

Instructions: You are looking for images of the campus’ educational facilities and buildings. Do not photograph people. Instead, focus upon the physical space and buildings.

Take a photograph that best represents your typical learning or working environment.

Image # 3: _________________________________________ (caption for your image)
1. Glue your image here and label with a caption.
2. Mark the location on the attached map.
3. Add your comments or explanation below. You may choose to go over the page and use diagrams or sketches to explain your meaning.

In Investigating educational facilities planning and design in the context of learning communities
Case Study of _____________

Participant Generated Photographs of the Built Environment/School Facilities

Name of participant: _______________________ Staff  ☑ Student  ☑

Instructions: You are looking for images of the campus’ educational facilities and buildings. Do not photograph people. Instead, focus upon the physical space and buildings. Take a photograph that responds to the following:

What type of space/place least inspires or encourages you to work/learn?
or
Which actual space/place least inspires or encourages you to work/learn?

Image # 4: _________________________________________ (caption for your image)
1. Glue your image here and label with a caption.
2. Mark the location on the attached map.
3. Add your comments or explanation below. You may choose to go over the page and use diagrams or sketches to explain your meaning.
Appendix 30 - Great Places for Learning Questionnaire

Conducting the “Great Places for Learning” activity with teachers and students.

1. Researcher takes a series of photographs of learning spaces and places found within the school. Selection is made according to school's current use of the spaces and various features the literature on pattern languages for school has identified as common or necessary for modern classrooms. These photographs are taken at an early visit to the school. The photographs are clearly labelled using letters of the alphabet or numbered.

2. Photographs are displayed in a space large enough for students to access in an informal setting. For example, multiple sets displayed on pin boards or laid out on tables. A table with drawing materials is also available for participants to use in their responses.

3. Participants enter the display room/space and are given copies of the response sheet and pens. They are free to sit anywhere to answer the questions, move freely around the space, give responses in any order they wish, and look at the photographs as many times as they like. Participants will be informed that if they do not want to participate in any or all of the activities, they can skip parts or put the form into the reply box without completing it.

4. The responses are anonymous and participants deposit sheets in a reply box.

5. Language and complexity of the questions will be modified for students younger than 14 years of age.

Optional activity – distributed through workshop or by class teacher.
Participants are invited to pick up information sheets, consent forms and response sheets for the follow-up Participant-Generated-Photographs/Images activity. This is not completed during the “Great Places for Learning” activity.
Great Places for Learning
A research activity for students from Stage 3

Please tick: Male □ Female □

Question 1. Which do you think is the best facility (e.g., IRC) or classroom in your school?

Can you give a reason? _______________________________________________
___________________________________________________________________
Is this place shown in any of the photographs? Yes □ No □
If yes, then which one … write down its label. Photo _____
If no, is there a photo that looks most like this place? Photo _____

Question 2. What part of your usual classrooms do you like to use the most?

Can you give a reason? _______________________________________________
___________________________________________________________________
Is this part shown in any of the photographs? Yes □ No □
If yes, then which one … write down its label. Photo _____
If no, is there a photo that looks most like this part? Photo _____

Question 3. What part of your usual classrooms do you like to use the least?

Can you give a reason? _______________________________________________
___________________________________________________________________
Is this part shown in any of the photographs? Yes □ No □
If yes, then which one … write down its label. Photo _____
If no, is there a photo that looks most like this part? Photo _____

Question 4. Is there any particular thing about your classroom that makes it difficult for you to learn?

Can you give a reason? _______________________________________________
___________________________________________________________________
Is this thing shown in any of the photographs? Yes □ No □
Question 5. If you could work by yourself anywhere you like in the college, where would you choose to do work by yourself?

Can you give a reason? __________________________________________________________
____________________________________________________________________________

Is this place shown in any of the photographs? Yes ☐ No ☐

If yes, then which one … write down its label. Photo _____

If no, is there a photo that looks most like this place? Photo _____

Question 6. If you had to work with in a group and you could work anywhere you like in the college, where would you choose to do that group work?

Can you give a reason? __________________________________________________________
____________________________________________________________________________

Is this place shown in any of the photographs? Yes ☐ No ☐

If yes, then which one … write down its label. Photo _____

If no, is there a photo that looks most like this place? Photo _____

Question 7. Are there opportunities for students to use the educational buildings, facilities and classrooms outside of class time?

If yes, when and for what purpose(s)? ________________________________

Question 8.

Look at the photographs on display and find places where you would like to do the following activities. When you find a place, write down the label of the photograph.

* Where do you think students could work with other students on projects during lunchtime/recess? Photograph _______

* Where do you like relax with other students during meal breaks? Photograph _______
* Where do you like to play games during meal breaks? Photograph ______

* Where could you talk quietly with a teacher about some work? Photograph ______

* Where do you think a student could give a talk or presentation to your class? Photograph ______

**Question 9.**
Look at the photographs on display and decide which place do you like the most. When you find the place, write down the label of the photograph and give a reason why you choose that particular photograph.

The place I like the most in the college is shown in Photograph ____ .

I like this place because ______________________________________

**Question 10. If you could design your own great place for learning, what would it be like?**

In the space below, can you describe your ideas? What would that place include? You might want to draw a diagram or cartoon instead of writing.

* *My idea of a great place to learn is:*

Thank you for helping me with this activity.
Great Places for Learning
A research activity for teachers from Stage 3

Please tick: 

[ ] Male  [ ] Female

**Question 1.** What do you think is the best educational facility or classroom in your school?

Can you give a reason? __________________________________________
_________________________________________________________________

Is the place shown in any of the photographs?  

[ ] Yes  [ ] No  

If yes, then which one … write down its label.  

Photo _____

If no, is there a photo that looks most like this place?  

Photo _____

**Question 2.** What part of your usual classroom do you like to use the most?

Can you give a reason? __________________________________________
_________________________________________________________________

Is the part shown in any of the photographs?  

[ ] Yes  [ ] No  

If yes, then which one … write down its label.  

Photo _____

If no, is there a photo that looks most like this part?  

Photo _____

**Question 3.** What part of your usual classroom do you like to use the least?

Can you give a reason? __________________________________________
_________________________________________________________________

Is the part shown in any of the photographs?  

[ ] Yes  [ ] No  

If yes, then which one … write down its label.  

Photo _____

If no, is there a photo that looks most like this part?  

Photo _____

**Question 4.** Is there any particular thing about your classroom that makes it difficult for you to carry out your teaching?

Can you give a reason? __________________________________________
_________________________________________________________________
Is this thing shown in any of the photographs?  Yes ❑  No ❑
If yes, then which one … write down its label.   Photo _____
If no, is there a photo that looks most like this thing?   Photo _____

**Question 5. If you could work anywhere in the college by yourself, where would you choose to do that work?**

Can you give a reason?  _______________________________________________
_________________________________________________________________

Is this place shown in any of the photographs?  Yes ❑  No ❑
If yes, then which one … write down its label.   Photo _____
If no, is there a photo that looks most like this place?   Photo _____

**Question 6. If you could work anywhere in the college with a group of students on a collaborative project, where would you choose to do that group work?**

Can you give a reason?  _______________________________________________
_________________________________________________________________

Is this shown in any of the photographs?  Yes ❑  No ❑
If yes, then which one … write down its label.   Photo _____
If no, is there a photo that looks most like this place?   Photo _____

**Question 7. Are there opportunities for students to use the educational facilities and learning spaces outside of class time?**

Yes ❑  No ❑
If yes, when and for what purpose(s)?  ____________________________________________

**Question 8. Looking at the photographs on display.**

Can you find places where you think students would like to do these activities. Write down the label of the photograph that corresponds to your choice.

Work with other students on projects during lunchtime/recess.   Photograph _____

Relax with other students during meal breaks.   Photograph _____
Play active games and activities during meal breaks. Photograph ______

Where a student could talk quietly with a teacher about some work. Photograph ______

Where a student could give a talk or presentation to the class. Photograph ______

**Question 9. Can you look at the photographs on display and decide which place most represents a great place for learning and one you would like to use?** When you find a place, write down the label of the photograph and give one reason for your choice.

The place I like the most is shown in Photograph ______

I like this place the most because __________________________________________

____________________________________________________________

*Thank you for participating in this activity. Your responses are greatly appreciated.*
Appendix 31 - Photographic surveys

Analysing Photographs for Learning Community Features & Pattern Language - Acacia College (126 photographs in 10 zones)
Criteria for analysing educational facilities and learning environments

<table>
<thead>
<tr>
<th>Patterns (Code)</th>
<th>Features / language</th>
<th>Photograph showing place &amp; feature</th>
<th>Number of occurrences in place</th>
</tr>
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<tbody>
<tr>
<td>Personalised P</td>
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<td></td>
<td>• Distributed resources</td>
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<td>• Home base &amp; individual storage</td>
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<td>72</td>
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<td>• Campfire space</td>
<td>82/86/87</td>
<td>5</td>
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<td>• Cave space</td>
<td>91/95</td>
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### Patterns (Code)

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### Classroom learning community models

<table>
<thead>
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<th>Configuration</th>
<th>As shown in photograph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbourhoods - central open space used in common by the classrooms surrounding this space. Rooms installed with a range of operable walls. Learning spaces can be expanded and linked in a range of combinations.</td>
<td>14-29 &amp; 38 (eg. areas around COLA, B &amp; C Blocks) =&gt; zones C, D, F, G. Years 3 to 12 are be moved into neighbourhoods. Original pod designs were based on this model. School growth has overtaken design of these small neighbourhoods.</td>
</tr>
<tr>
<td>Villages – A number of neighbourhoods are arranged along or around a larger common area used by the neighbouring classroom clusters. This circulation spine/zone can be used individually by each neighbourhood or for an all-school activity.</td>
<td>Growth of college is leading this way. New discussions to devise a master plan that will unify shared areas and neighbourhoods as next building projects are brought in over the years.</td>
</tr>
<tr>
<td>Studio Communities – clusters of flexible teaching spaces (can be virtual or loosely defined) that contain a range of learning modes arranged around a communal space for larger social and learning activities. Studios have own direct access to outside and to common areas – a more self-contained individual facility than the neighbourhood classrooms.</td>
<td>Evident in Zone E - Prep to Yr2 areas. See school building map.</td>
</tr>
</tbody>
</table>
### Analysing Photographs for Learning Community Features & Pattern Language - Grevillea College (109 photographs - 11 zones in school)

Criteria for analysing educational facilities and learning environments

<table>
<thead>
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<th>Patterns</th>
<th>Features / language</th>
<th>Photograph showing place/feature</th>
<th>Number of occurrences in place</th>
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Patterns | Features / language | Photograph showing place/ feature | Number of occurrences in place |
---|---|---|---|
Adaptable and Flexible | • Multi-use classrooms  
• Learning support - furniture and storage  
• Flexible boundaries  
• Adaptable utilities  
• Living buildings | 10  
47  
79  
92 | 1  
1  
1  
1  
Total = 4 |


Classroom learning community models

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<th>As shown in photographs</th>
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<tbody>
<tr>
<td>Neighbourhoods - central open space used in common by the classrooms surrounding this space. Rooms installed with a range of operable walls. Learning spaces can be expanded and linked in a range of combinations.</td>
<td>Interviews and survey indicated desire for neighbourhoods for the three schools but not present in physical learning environment.</td>
</tr>
<tr>
<td>Villages – A number of neighbourhoods are arranged along or around a larger common area used by the neighbouring classroom clusters. This circulation spine/zone can be used individually by each neighbourhood or for an all-school activity.</td>
<td>Master plan suggests an overlay that will use outdoor spaces (eg. COLA) to link the neighbourhoods. Only on paper at present - not currently evident in physical environment.</td>
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<tr>
<td>Studio Communities – clusters of flexible teaching spaces</td>
<td>nil</td>
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</tbody>
</table>
References


Clearinghouse for Educational Facilities.


Palmer, A. (2002). The Establishment of Middle Schooling @ Kinross College. www.docstoc.com


Patterson, G. (2001). Teaching and learning, professional development and computer technology: an action research case study of five classroom environments. Faculty of Education. Wollongong, University of Wollongong. Doctor of Education.


South Wales AIS Executive Conference. Brighton-le-Sands, NSW.


