Students Learning by Design

A study on the impact of Learning by Design on student learning

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

Keiju Suominen

School of Global Studies, Social Science and Planning
The Royal Melbourne Institute of Technology University

December 2009
Declaration

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

Keiju Suominen
28 November 2009
Acknowledgements

The completion of a PhD involves the cooperation and support of many people without whom it would not be possible to undertake such a complex learning journey.

Firstly, I would like to acknowledge the cooperation of the ACT Department of Education and Training that supports research in government schools to further understanding in the field of education. I extend my warmest gratitude to the students and teachers in the participating schools for their generous contributions to this study. It was only through their willingness to share their personal learning journeys that this study was possible. I would also like to thank Ms Rita van Haren for her encouragement, support and editorial eye for detail.

I extend my sincere and heartfelt respect and gratitude to my supervisor, Dean Mary Kalantzis, for her generosity in sharing her extensive knowledge and expertise in the process of guiding my learning journey. Her willingness to persevere with me on this journey despite the complexities of working across national boundaries and different time zones is much appreciated.

I would like to thank my second supervisor, Professor Nicola Yelland, for her ongoing encouragement and support of my work also from beyond Australia’s shores. These global relationships have added an interesting and enriching dimension to my PhD experience.

I warmly acknowledge the encouragement and practical assistance of the many kind individuals at both RMIT University and the University of Illinois who all contributed to making the road a little smoother and more enjoyable to travel including Professor Bill Cope, Dr Helen Smith, Dr Peter Burrows, Dr Les Morgan, Dr Daria Loi, Associate Professor Heather Fehring, Ms Rachael Dunstan, Ms Wendy Kunde and two fellow travellers on the post-graduate journey who preceded me, Dr Anne Cloonan and Ms Mary Neville.

Finally, I would like to thank my parents, Tuija and Aarne Suominen, for a lifetime of love, support and encouragement without which I would not have had the courage to embark on this complex learning journey.
Abstract

The Students Learning by Design study explores how Learning by Design theory applied in contemporary classrooms addresses the needs of learners in a rapidly changing technological and socio-cultural environment. Its starting point is a detailed examination of this changing environment of new knowledge workplaces and social spaces including virtual spaces to determine the nature of the changes to which education must respond. A careful analysis of a range of views on these changes and their impact on schools provide both cautionary and optimistic visions of the future for our students and teachers. The study locates Learning by Design within this contested ground of new learning and the analysis of these varied perspectives reveals commonalities and differences in responses to the changing technological and socio-cultural environment.

The study then proceeds to explore how Learning by Design theory translates into practice within several primary school classrooms in the Australian Capital Territory focusing on its impact on students’ learning experiences. The students within these classrooms are the major data source providing rich qualitative data on their perspectives on learning in classrooms where teachers use the eight knowledge processes of the Learning by Design planning framework. The data is examined using a triple lens analysis that incorporates these eight knowledge processes, the features of contemporary social spaces identified from the literature and student performance data supplied by their classroom teachers. In this way, the study is able to address the impact of Learning by Design on individual learners as well as to extrapolate its potential for addressing the needs of contemporary learners as a whole in a rapidly changing technological and socio-cultural environment.

In the light of this analysis, the study examines the implications of Learning by Design theory and practice for students, teachers and administrators. The changing role of teachers and students is highlighted along with practical considerations and limitations that may impact on the wider implementation of this approach to learning. The future of Learning by Design in our schools is left open to further exploration and the competing visions of what constitutes new learning for new times.
Prologue

In some ways, the *Students Learning by Design* study has been approached from an insider perspective. Just like my former colleagues and students, I was caught up in this bewildering historical moment of rapid technological and socio-cultural change while working in a relatively stable institution, the government primary school. Although in my twenty year career, I had witnessed other socio-cultural changes and the coming and going of different trends in education, nothing compared with the state of flux in our schools over the last decade as policy makers scrambled to address the changes occurring in the wider society. Ironically, in a time of increasing innovation and creativity, the prevailing agenda of policy makers for Australian schools was a return to the old basics.

At the same time, many dedicated and experienced teachers were becoming demoralised by the on-going teacher quality debates and ever-increasing layers of external accountability measures. There appeared to be limited respect for teacher professional judgement and expertise accompanied by an unwillingness to listen to the needs of teachers. Consequently, there has been a significant shift in teacher supply from a time at the beginning of my career when there was a serious over supply of teachers to the current situation where teacher shortages are quite common as more teachers, including early career teachers, leave the profession.

Just as I was beginning to re-evaluate my own future as a teacher, I was introduced to *Learning by Design*. Unlike other professional learning opportunities I had encountered during this time, *Learning by Design* presented an intellectual challenge drawing on my professional expertise as I engaged with the theory and the practical implementation of this approach in the classroom. Despite the inadequacies of my early attempts, the response from my students as well as colleagues led me to an instinctive belief that this approach had merit. However, I was not satisfied with my own level of understanding of either the technological and socio-cultural changes that were occurring in the wider society or my understanding of *Learning by Design*. This led to my embarking on the *Students Learning by Design* study, as I wanted evidence of the efficacy of this approach and to understand how this approach works in addressing the needs of contemporary students. Although I recognised that *Learning by Design* represented but one possible approach to new learning for new times, it provided a starting point for my exploration of the field.
My lived experiences as a teacher and witness to the changes during this time of change cannot but influence this study. However, as a personal learning journey belonging in the learning has made the research experience more powerful. Listening to the experiences of the students in the study, I have been forced to reflect on my own understandings and practices, and evaluate them from a different perspective. Although this may be confronting, it is also empowering, providing an opportunity for genuine professional growth. Recognising the personal nature of learning, others who read this study may uncover alternate interpretations and elements within the study to pique their interest. The intention of the study is to promote professional dialogue and to encourage further research and exploration in the area of new learning for new times. On a personal level, this study has given me a more hopeful outlook on the future of education, revealing new avenues of exploration for how we can improve the teaching and learning experiences as well as performance of both our teachers and students.
# Table of Contents

Students Learning by Design ................................................................. i  
A study on the impact of Learning by Design on student learning .......... i  
Declaration ......................................................................................... ii  
Acknowledgements ........................................................................... iii  
Abstract ............................................................................................... iv  
Prologue ............................................................................................... v  
Chapter 1 ............................................................................................. 1  
Introduction to Students Learning by Design .................................. 1  
1.1 Defining the Problem - Changing Times .................................. 1  
1.2 Exploring New Solutions for New Times ................................. 4  
1.3 Research Question and Objectives of the Study ....................... 6  
1.4 Significance of the Study ............................................................. 7  
1.5 Overview of the Study ................................................................. 9  
Chapter 2 ............................................................................................. 12  
New Learning for New Times ............................................................ 12  
2.1 Working, Living and Learning in New Times .............................. 12  
2.1.1 Contemporary Workplaces .................................................. 15  
2.2 The Contested Ground of New Learning .................................. 28  
2.2.1 A Childhood of Choice ......................................................... 30  
2.2.2 Teachers as Designers or Cultural Intermediaries ................ 42  
2.2.3 The New Learning Hypothesis .............................................. 48  
Chapter 3 ............................................................................................. 53  
Testing the New Learning Hypothesis ............................................. 53  
3.1 Rationale ....................................................................................... 53  
3.1.1 Exploring Complex Contemporary Phenomena .................. 55  
3.1.2 Children’s Voices ................................................................. 57  
3.1.3 Ethical Research with Children and their Teachers .............. 58  
3.2 Research Design ......................................................................... 60  
3.3 Collecting the Evidence ............................................................... 62  
3.3.1 Learning Designs ................................................................. 62  
3.3.2 Learning Journals and Conversations .................................. 66  
3.3.3 Processes, Products and Performance ................................. 70  
Chapter 4 ............................................................................................. 75  
Setting the Scene – People and Places ............................................. 75
A Triple Lens Analysis of New Learning............................. 96

5.1 Designing for Belonging and Transformation ..................... 96

5.2 Identifying Patterns in the Data ..................................... 97
5.2.1 Learning Designs .................................................. 98
5.2.2 Learning Journals and Conversations ............................. 107
5.2.3 Teacher Assessments of Products, Processes and Performance ............................................. 114

5.3 Shared Passion for Learning ........................................... 118
5.3.1 Explicitness ......................................................... 119
5.3.2 Personal Connection ................................................ 125
5.3.3 Interactivity ........................................................ 129

5.4 Shared Knowledge ...................................................... 136
References ........................................................................................................... 225

Lessons Learnt .................................................................................................... 213

7.1 The Nature of New Learning ........................................................................ 213
  7.1.1 Belonging .................................................................................................. 214
  7.1.2 Transformation ......................................................................................... 218

7.2. Changing Roles ............................................................................................ 212
  7.2.1 The Teacher .............................................................................................. 213
  7.2.2 The Student ............................................................................................. 218

7.3. Workplace and Community Participation ..................................................... 220

7.4. Conclusion .................................................................................................... 223

Chapter 6 .......................................................................................................... 156

Tales of Transformation ................................................................................... 156

6.1 Different Perspectives .................................................................................... 156

  6.1.1 Critical Consumers .................................................................................. 158
    6.1.1.1 Mark .................................................................................................. 160
    6.1.1.2 Trent ................................................................................................. 164
    6.1.1.3 Sam .................................................................................................. 170

  6.1.2 Capable Operators .................................................................................... 174
    6.1.2.1 Julia .................................................................................................. 175
    6.1.2.2 Emma ............................................................................................... 178
    6.1.2.3 Steve ................................................................................................. 181

  6.1.3 Unrewarded Workers ................................................................................ 183
    6.1.3.1 Marie ............................................................................................... 184
    6.1.3.2 Rob .................................................................................................. 194

  6.1.4 Risk Minimisers ...................................................................................... 198
    6.1.4.1 Rose ................................................................................................ 200
    6.1.4.2 Mandy .............................................................................................. 204

  6.1.5 Fledgling Learners ................................................................................... 207
    6.1.5.1 David .............................................................................................. 208
    6.1.5.2 Kate ................................................................................................ 210

Chapter 7 .......................................................................................................... 156

Chapter 7 .......................................................................................................... 156

7.1 The Nature of New Learning ........................................................................ 213

  7.1.1 Belonging .................................................................................................. 214
  7.1.2 Transformation ......................................................................................... 218

7.2. Changing Roles ............................................................................................ 212
  7.2.1 The Teacher .............................................................................................. 213
  7.2.2 The Student ............................................................................................. 218

7.3. Workplace and Community Participation ..................................................... 220

7.4. Conclusion .................................................................................................... 223

References .......................................................................................................... 225

ix
List of Tables
Table 3.1 Grid for tabulation of knowledge processes in learning elements ..................... 64
Table 3.2 Grid for tabulation of features of new social spaces in learning elements ........ 64
Table 3.3 Cross tabulation grid of features and knowledge processes .......................... 65
Table 3.4 Tabulation grid of features in student learning journals and conversations ...... 69
Table 3.5 Learning by Design Criteria for Measuring Learning ................................. 71
Table 3.6 Grid for tabulating student performance data ........................................... 73
Table 5.1 Results of knowledge process tabulation of learning elements ...................... 103
Table 5.2 Results of tabulation of features in learning elements ................................... 104
Table 5.3 Results of cross tabulation of features and knowledge processes in learning elements .............................................................................................................. 105
Table 5.4 Student response data for research cohort A ............................................. 108
Table 5.5 Student response data for research cohort B ............................................. 109
Table 5.6 Student response data for research cohort C ............................................. 111
Table 5.7 Summary of student response data .......................................................... 112
Table 5.8 Student performance data research cohort A ............................................. 114
Table 5.9 Student performance data research cohort B ............................................. 116
Table 5.10 Cross-referenced data from learning elements and student responses on explicitness ................................................................. 119
Table 5.11 Cross-referenced data from learning elements and student responses on personal connection ......................................................................................... 126
Table 5.13 Cross-referenced data from learning elements and student responses on knowledge sharing and collaboration ................................................................. 137

List of Figures
Figure 5.1 Graph of literacy results for research cohort C ............................................ 118
Chapter 1

Introduction to Students Learning by Design

This chapter positions the research within the context of the rapid socio-cultural and technological changes over the past decade and a half that have impacted on the lives of children and the institutions in which they learn. Links are drawn to the broader Australian Research Council (ARC) funded *Learning by Design: Creating pedagogical frameworks for knowledge building in the 21st century* project of which this study forms a small part. The research question and objectives are identified setting the research parameters. A brief chapter outline is also included providing an overview of the study.

1.1 Defining the Problem - Changing Times

The past decade and a half has been one of significant social and technological change. New jobs have been created and new ways of working have been explored. These changes in the wider society have also impacted on the lives of children. There has been an explosion in consumer culture, evident in the school context by the number and variety of toys and other consumer goods children bring into the classroom to share with their peers. It has also been a time of media saturation with children exposed to influences from a range of fields and cultural contexts with fears expressed that “in many ways, corporate pedagogues have become post-modern society’s most successful teachers” (Kenway & Bullen, 2005, p.36). Children’s interests have diversified and their awareness of contemporary issues has grown; however, this has not always been matched by a critical awareness of how media messages are constructed and for what purposes.

Children’s lifeworlds today have become characterised by choice. New technologies have opened up growing possibilities for new social relationships that are not fixed to place, where a sense of belonging is not necessarily linked to the community in which they live. Role models are selected not just from personally significant individuals in their lives but also from the media including figures from popular culture. Multiple, fluid identities are formed based on exposure to a myriad of influences from an increasingly wide range of contexts (Yon,
Their lives are marked by diversity and change, where they are presented with an increasing array of choices about their personal affiliations and lifestyles.

These social and technological changes in children’s lives have not always been mirrored in the predominant political influences on Australian schools during this time. Rather attempts have been made to maintain Australia’s global competitiveness by returning to a focus on the basics of literacy and numeracy accompanied by a strong emphasis on content knowledge in the learning areas. Standardised tests have been introduced to assess the performance of students with much of the debate on educational standards focussing on the under-performance of certain groups of students based on gross demographic indicators such as gender and socio-economic background as well as on the efficacy of teachers (Ainley et al 2004, Skilbeck & Connell 2004, Watson 2005). Rowe (2003) effectively summarised the prevailing political landscape in education:

Consistent with the adoption of corporate management models in educational governance and the prevailing climate of ‘outcomes-driven’ economic rationalism in which such models operate, policy activity related to issues of accountability, assessment monitoring, performance indicators, quality assurance and school effectiveness is widespread. However, economic and industrial issues surrounding school effectiveness and teacher quality are especially sensitive ones at the present time given the level of consensus regarding the importance of school education as an essential element of both micro- and macro economic reform, and in meeting the constantly changing demands of the modern workplace (p.2).

In this political context, there has been limited discussion about the impact of the changing socio-cultural and technological landscape on contemporary workplaces in relation to the inevitable changes necessary to our industrial era schools to prepare students for these changing workplaces as well as for new forms of community participation. Kalantzis and Cope (2005) argue, “the emerging ‘knowledge society’ requires a radically new approach to learning” (p.3).

In effect, students’ lifeworlds have been changing but schools have not kept pace with the rapid technological and socio-cultural changes of the past decade. As a consequence, Kenway and Bullen (2005) argued that many students today have a ‘5D relationship’ with schooling – “they are dissatisfied, disengaged, disaffected, disrespectful, and disruptive” (p.31). Working
in schools it was evident that teachers were acutely aware of the negative impact of student disengagement on academic performance and behaviour, and the need for change. Many teachers themselves have experienced an uncomfortable sense of being left behind and left out of the many promises that these social and technological changes offered. Initially, the rollout of new technologies in schools was slow compared to other contemporary workplaces and new possibilities for work organisation were often left unexplored. More importantly, discussions about the pedagogical implications of these changes have often been submerged in the aforementioned debates about educational standards and teacher quality.

It is often assumed that teachers have considerable agency as to the choice of content and pedagogy used in the classroom. Ironically, at a time when most organizations are experiencing a process of informalization with “management through negotiation as opposed to management by command and a higher degree of fluidity in hierarchal organizational structures and flexibility in performance of roles” (Featherstone, 2004, p.45), teachers have been experiencing greater administrative control over their professional work. The use of standardised testing, system curriculum guidelines and teacher performance reviews as well as in some jurisdictions performance based pay or school funding have been exerting great pressure on teachers to narrow their educational focus and discouraging them from exploring new educational initiatives in response to the specific needs of their students (Cummins, 2001; Vickers & Singh, 2005).

However, despite more than a decade of this ‘back to basics’ agenda, politicians, employers and the wider community still seem dissatisfied with the quality of our education system. It appears that:

Education and business may have more in common than either one realizes. For example, both may be facing a tasking and/or diminished future. The pressure for constant academic gains in education and for increases of productivity in business may be approaching the law of diminishing returns. Schools and companies may in fact be encountering the same common outer limits of incremental improvement. In other words, we may be stuck in the successes of past thinking and learning (Buchen, 2006, p.ix).

Teachers, however, do not necessarily feel that they have been failing their students but, like everyone else, they have been grappling with the rapid social and technological changes
taking place around them and actively working out how to respond to these changes through their work. At times, they may have questioned the wisdom of ‘back to basics’ agendas; however, they have implemented the required initiatives. Unfortunately, they have often been left feeling dissatisfied that these initiatives were not meeting the needs of their students that there was still something more that could be implemented to meet the needs of the students as well as their future employers. These teachers did “not passively accept the dominant streams of these complex systems in transition but instead tactically resist them and reinterpret them to generate alternative social practices, relations, and meanings” (Monahan, 2005, p.4).

1.2 Exploring New Solutions for New Times

For the teachers and researcher in this study, this revolutionary act began simply through attendance at two professional development seminars presented by Professor Mary Kalantzis and Dr Bill Cope who introduced the possibility of exploring a new educational response to these changing times. This response was Learning by Design. Participation in their new research project provided the opportunity to explore the possibilities and challenges of these new times and to evaluate the efficacy of this approach to teaching and learning. This was an invitation to actively engage in the change process and to potentially influence future directions in education.

The teachers in the Australian Research Council (ARC) funded Learning by Design: Creating pedagogical frameworks for knowledge building in the 21st century project have been actively exploring new responses to the rapidly changing social and technological environment around them. This project built on the earlier work of the ARC Multiliteracies projects (Kalantzis & Cope 1996-2002) which demonstrated the effectiveness of learning environments that harnessed diversity, incorporated varied knowledge processes and used a range of multimodal means of communication to enhance student learning. This new project spans three different jurisdictions, nine schools and forty-two teachers over the life of the project, co-opting the expertise of the teachers themselves as co-researchers to create intimate insights into the work of teachers as they create, enact and evaluate new learning designs for their students using the Learning by Design framework. Working in this way, a unique opportunity was provided to explore teachers’ professional responses to the challenges of the new social and technological environment and their approach to building their own expertise and understandings through collaboration with their colleagues and the university. Through this work, the teachers and researchers were developing an understanding of “how can a pedagogical framework be designed to foster practices that are more inclusive and cognisant
of the increasingly diverse needs and ways of knowing of children?” (Kalantzis, Yelland, Cope et al, 2005, p.3)

Importantly, Kalantzis and Cope (2005) identified two key conditions for learning – belonging and transformation:

Belonging occurs where formal learning engages with the learner’s experiential world (lifeworld). Successful engagement must recognise difference and actively take account of the diverse identities of learners. Transformation occurs when a learner’s engagement is such that it broadens their horizons of knowledge and capability (p.37).

In working with the Learning by Design planning framework with its eight knowledge processes of Experiencing the Known and Experiencing the New, Conceptualising by Naming and Conceptualising by Theorising, Analysing Functionally and Analysing Critically, and Applying Appropriately and Applying Creatively, the teachers were exploring whether their learning designs met these two key conditions of learning. This research also provided the opportunity to explore how belonging and transformation were created through the learning designs and their enactment and the significance of these two conditions of learning for students in the contemporary context.

Therefore, within the context of this broader project on the professional work of teachers, a smaller group of teachers and their students agreed to participate in the Students Learning by Design study, willingly sharing their learning journeys so that we could explore whether anything had changed in these classrooms for students – would we find the comfortable and the familiar or would we encounter the new and different? New technologies have crept into schools but have the pedagogies in schools changed in response to the socio-cultural changes that have accompanied these technologies? For a teacher researcher entering a school as a research site, one expects to find the familiar, the comprehensible yet this is also accompanied by an apprehension that nothing new will be discovered, that Learning by Design will reproduce the types of learning characteristic of traditional schools.

However, instinctively there was a sense that something was different for the teachers and students working with Learning by Design. Prior to commencing the research project, working with a dedicated and experienced group of teachers, we had begun to experiment with the Learning by Design framework. Anecdotally, changes were evident for both the
teachers and students but to fully understand the nature of these changes and to evaluate the
efficacy of *Learning by Design* in meeting the challenges of the new social and technological
environment, we needed to explore more fully its impact on the students. In this way, the
study contributes to the aim of the overall *Learning by Design* project of “analysing and
evaluating the extent to which pedagogical choices are inclusive of the diverse learning needs
and ways of knowing of children” (Kalantzis, Yelland, Cope et al, 2005, p.3). The research
presented the opportunity to engage in the same sort of creative and innovative search for
solutions that other knowledge-based industries have participated in over the last decade and a
half. Within this study, it was possible to explore the socio-cultural dimension of the changes
in our schools and workplaces, and not just the different technologies and their impact on
these institutions.

### 1.3 Research Question and Objectives of the Study

Whereas the broader *Learning by Design* project focussed largely on the work of the teachers
in the project and the artefacts they collected as co-researchers, the *Students Learning by
Design* study focussed on the students and the artefacts they produced when working on
learning activities planned by their teachers using the *Learning by Design framework*. This
included the students’ personal responses to these learning activities. With this student focus,
the study explored the following research question:

What are the features and outcomes of student learning experiences in classrooms
using the *Learning by Design* framework?

As the study was also located within the wider *Learning by Design* context of designing new
learning for new times, one of the challenges of this study was to be open to the new and not
just focussing on the old, accepted measures of success and quality but to try to understand
what was different and why this difference was so important. For *Learning by Design* to
address the demands of new times, it needed to mirror the socio-cultural and technological
changes within contemporary workplaces and the wider community. Therefore, within the
study it was necessary to explore what was different about contemporary workplaces and
other social spaces, and to try and understand the new expectations on schools presented by
these changes. In other words, what did our political leaders, employers, students and the
wider community really expect from 21st century schools beyond the old basics? It may even
be argued that during the past decade and a half there was some uncertainty about the nature
of the changes needed and therefore, the response was to fall back on the familiar and the
secure in the hope that it would address the needs of the future. The challenge for the *Students Learning by Design* study was to determine whether *Learning by Design* provided a new response to the challenges of the future that addressed these socio-cultural and technological changes.

The learning journeys of the teachers and students in this study as they worked on learning elements designed using the *Learning by Design* framework would enable us to explore the nature of this new learning and its impact on both students and teachers, addressing the research objectives to:

- Identify the types of learning occurring during designed learning experiences – both the intended and the unexpected.
- Examine the role of the student and the teacher in the learning process.
- Identify how student subjectivities are engaged in the learning process.
- Explore how *Learning by Design* prepares students for new and evolving forms of work and community participation.

Using the personal experiences of the students in this study, we can evaluate the nature and significance of belonging and transformation in the context of new learning. Further, by examining the learning journeys of both the teachers and students we can build a greater understanding of how the complexities of the changing social and technological environment manifest themselves in the learning designs and learning experiences of the students. By identifying the features of new learning, we can also match these against the features of contemporary workplaces and other social spaces to determine how new learning meets the demands of new knowledge societies preparing students for both active and productive citizenship.

### 1.4 Significance of the Study

In the spirit of Schostak (2002), this study begins by looking at individuals in its endeavour to understand the complex socio-cultural changes impacting on our schools:

> This project of exploring the complexities of contemporary life begins not by trying to grasp the totality, but by trying to see what is at stake for individuals and groups in their everyday lives at home, in the workplace, the street corner, the classroom and to address the problems they face (p.133).
By understanding the experiences of a small group of teachers and their students, we can begin to imagine new learning possibilities in response to the challenges of these changing times. Responses beyond incremental changes in student performance on standardised tests to an education that meets the needs of employers for flexible, creative and innovative workers of the future capable of working in diverse and changing teams across national boundaries and existing knowledge disciplines.

This study is intended to inform the debate on the nature of new learning and what constitutes a quality education in the 21st century. It explores the issue within the broader context of the changes occurring in contemporary workplaces and the wider community linking the necessary changes to our schools closely with the communities and economies they serve. This recognises the important role education plays in contemporary knowledge economies as well as the important social role of education in supporting the equitable and active participation of all citizens in the community. However, it is recognised that Learning by Design emerges from the contested ground of the new learning debate and that other approaches also merit investigation, creating possibilities for the comparative analyses of these different responses to new times. Unfortunately, within the scope of this study it was only possible to explore the implementation of Learning by Design and in a limited sample of primary school classrooms within one jurisdiction providing a snapshot of the potential of this approach in addressing the needs of students. Further research on Learning by Design as well as other approaches would benefit both educational researchers as well as classroom teachers in identifying the best responses to the technological and socio-cultural changes that are impacting on our schools.

This qualitative research study is intended to complement the various statistical studies on student achievement and with its strong student focus, set out an additional perspective to the debate on educational quality and student performance. It aims to give young students a voice to explain the various factors that impact on their learning and how this influences their overall experiences of schooling especially in relation to their experiences with Learning by Design. After all, any changes instituted in our schools will have the greatest impact on the students potentially effecting their future workforce and community participation. This student perspective with its personal comparisons contributes to the examination of whether this new approach to learning enhances students’ academic performance and adds value to the
students’ educational experiences by providing something different to what the students’ had experienced in the past, possibly highlighting some unexpected issues for consideration.

1.5 Overview of the Study

Chapter 1 - Introduction to Students Learning by Design sets the research within the socio-political context of the times and the impact on schools of the socio-cultural changes in society heralded by the rapid changes in information communication technologies. It embeds the Students Learning by Design research study in the broader Australian Research Council (ARC) funded Learning by Design: Creating pedagogical frameworks for knowledge building in the 21st century project providing a brief history of the evolution of the study, including the researcher’s interest and involvement in the project. The chapter also sets out the parameters of the study highlighting the research focus and providing an outline of the research. The potential significance of the study to the ongoing debate on the nature and form of new learning is also canvassed.

Chapter 2 - Surveying the Research Field reviews literature on the changing socio-cultural environment in contemporary knowledge societies to build a picture of the nature of new social spaces including workplaces and virtual environments, and the way knowledge is constructed and used in these environments. The work of these different experts in the field is examined for patterns to identify some common features of these new social spaces. These features are used in the development of an analytical frame for the examination of the research data in the study.

The second part of the literature review explores the perspectives of different theorists and commentators in the field of education on these socio-cultural changes. From these diverse perspectives, the implications of these changes are examined in relation to their impact on children and their teachers as well as on schools and education as a whole. In the light of these differing views on the changes needed in education to address the socio-cultural and technological changes in knowledge societies, the new learning hypothesis is presented.

Chapter 3 - Testing the New Learning Hypothesis provides the rationale for the qualitative approach chosen for the research study noting that “not everything can be said in a test score; for some things we need literary forms” (Eisner, 1998, p.23). The chapter describes how an alternate approach was chosen to give the students in the research study a voice, making use of the various sources of evidence available in the artefact rich environment of the classroom.
It also highlights the sensitivities around conducting research with children and the important ethical considerations that need to be addressed when working in schools.

The chapter also outlines the research design and describes the research tools used to collect the evidence for the study. From the multitude of artefacts produced during the everyday activities of students and their teachers in the classroom, the relevant data sources for the study are identified. The coding of the data from these various sources is then described with an explanation of how the data is treated for analysis.

**Chapter 4 - Setting the Scene** places the research within the context of the education jurisdiction, from which the schools were selected for the study. Background information on the individual research sites is provided describing the schools and introducing the teachers participating in the study. The teacher designed learning elements on which the students would be working during the study are outlined, highlighting the different learning areas and approaches of the three different learning elements. The students from the three research cohorts, participating as key informants in the study, are also introduced with their different lifeworld experiences and perspectives.

**Chapter 5 - A Triple Lens Analysis of New Learning** presents the tabulated data from the research, identifying patterns within it using the lenses of the eight knowledge processes from the *Learning by Design* framework, the features of new social environments identified from the literature review and the performance data collected on the students. Through the gradual layering of the three lenses, an increasingly rich picture emerges of the impact of *Learning by Design* on students in the three research sites.

The results of the data analysis are examined in relation to the research literature in the field to identify links and contradictions, and to build a picture of how *Learning by Design* addresses the issues associated with the socio-cultural changes described in the literature. Through this process, the research objectives are explored as the types of learning occurring in the classrooms are identified, the roles of students and teachers in the learning process are examined, and the nature of student engagement and participation is considered in relation to both their current contexts and future endeavours.

**Chapter 6 - Tales of Transformation** gives voice to the individual perspectives of the student key informants in the study. Using the research literature and observations of the
different students’ approaches to schooling, different types of learners are identified in the research settings. Their different characteristics are highlighted in relation to their past and present experiences of schooling. The students’ tales of transformation are then categorised according to these learner types, allowing these very personal stories to inform our understanding of learners more generally.

Through the students’ stories, the analysed data is returned to the personal context from which it was drawn to highlight the impact of the learning elements, designed using the Learning by Design framework, on individual learners. Using the various data sources, personal stories of belonging and transformation emerge to enrich the research picture and to further inform our evaluation of the efficacy of this approach to new learning in addressing the needs of learners.

**Chapter 7 - Implications of the Study** draws together the findings of the Students Learning by Design research study. The potential implications of these findings for both educational policy as well as practice are canvassed, especially in relation to the role of teachers in the change process and the changing role of students in the learning process. Further, these findings are linked to the role of schooling in preparing learners for participation in new social spaces and workplaces.
Chapter 2

New Learning for New Times

This literature review explores the claims for the need for new learning for new times. It provides a rationale for the reconceptualisation of learning in schools to address the socio-cultural effects of the rapid technological changes that are impacting on the ways people live, work and learn. Through the literature review, the features of new socio-cultural spaces and, in particular, contemporary knowledge workplaces are identified and their potential impact on the nature of new learning is explored, acknowledging the close social and economic relationship between education and employment. In the light of this examination of new socio-cultural spaces, the literature review then focuses on school learning and the differing perspectives on new learners and their needs, and the changing role of teachers in the learning process. Finally, the literature review presents the new learning hypothesis of this study, outlining the Learning by Design approach to new learning.

The features of new socio-cultural spaces identified through this literature review, the eight knowledge processes in the Learning by Design framework, along with student performance measures, is later used in a triple lens analysis of the research data. This analysis tests the new learning hypothesis to determine the efficacy of learning elements designed using the Learning by Design framework in addressing the needs of new learners and their future employers.

2.1 Working, Living and Learning in New Times

Rapid advances in information communication technologies have brought with them socio-cultural changes impacting on systems of belonging and the ways people interact in workplaces as well as in social contexts. These changes are a part of the process of increasing globalisation. Lo Bianco (2000) contends that the process of globalisation has accelerated describing three main forces driving this process:
The first is the almost universal phenomenon of market deregulation; the second is the advanced integration of international financial markets; and the third is the critical facilitating force of instantaneous communications (p.93).

This third driving force of globalisation, instantaneous communications, marked by rapid flows of information across vast distances, has opened up new opportunities for the development of business and social networks in both real and virtual environments. It has also opened up growing possibilities for the development and maintenance of social relationships that are not tied to a fixed place, where a sense of belonging is not necessarily linked to the community in which a person lives.

The concept of diaspora is commonly associated with migration and is defined by Yon (2000) “as a theoretical concept that helps us to think about culture and cultural processes as forged through transnational networks and identifications” (p.18). These types of transnational networks and identifications are becoming more evident around the world, with multiculturalism becoming “a global phenomenon with unprecedentedly large and differentiated population transfers in all parts of the globe” (Lo Bianco, 2000, p.93). However, in the contemporary socio-cultural environment where people have increasing associations and networks across national boundaries and even in virtual worlds, this concept is no longer applicable to just members of migrant and refugee communities but can be applied to this multitude of individuals with transnational social and work affiliations, possessing multiple identifications with different groups for different purposes.

Therefore, contemporary socio-cultural environments including workplaces and schools can be considered to be sites of ever increasing personal diversity where participants cannot be defined by conventional gross demographic markers of difference such as ethnicity, age or gender (Kalantzis & Cope, 2005). Individuals are no longer considered to have one fixed identity but rather multiple fluid identities that change and develop based on an individual’s experiences and choices. Yon (2000) refers to identities constructed around:

Nation, community, ethnicity, race, religion, gender, sexuality, and age; identities premised on popular culture and its shifting sets of representational practices; identities attached to fashion and new imagined lifestyles, to leisure and work, and to the mundane and the exotic; identities made in relation to place and displacement, to community and to a sense of dispersal, to “roots” as well as “routes” (p.1).
A sense of belonging is no longer created through identification with a physical space or place. Instead, a symbolic sense of belonging is created through the interactions of diverse individuals as they create a cultural space in which to work, learn or play. Within this space, their sense of belonging is created through shared interests, goals, language, and knowledge.

Within this changing socio-cultural context, it is important to consider the relationship between education and employment. From the early industrial era schools have reflected not only the socio-cultural environment of the times but also the productive relationships evident in workplaces, with Matthews (1980) arguing that “the structure of schooling prefigures the productive relations in which students will find themselves” (p.193). In Kalantzis and Cope’s (2005) work on new learning, the features of early industrial, developed industrial and knowledge society workplaces are described along with the features of schooling in these times, demonstrating the close correlation between the features of workplaces and schools over time. Concern has also been expressed about this relationship between education and employment, including in the contemporary context by Apple (2001), McLaren (2005) and Monahan (2005), with McLaren contending that:

We are witnessing the progressive and unchecked merging of pedagogy to the productive processes within advanced capitalism. Education has been reduced to a subsector of the economy, designed to create cybercitizens within a teledemocracy of fast-moving images, representations, and lifestyle choices powered by the seemingly frictionlessness of finance capital (p.24).

Despite the sometimes problematic relationship between education and employment, there is an acknowledged social expectation that schools play a role in preparing students for the world of work, with researchers such as Darling-Hammond (2006) and Warner (2006) linking the provision of quality curriculum with students’ ability to effectively compete in the new global economy. From an educational policy perspective Ball (1998) described two different perspectives on this relationship, “the first involves a reaffirmation of the state functions of education as a ‘public good,’ while the second subjects education to the disciplines of the market and the methods and values of business and redefines it as a competitive private good” (p.125). However, regardless of the perspective, the role of education was tied to national or personal economic interests. As Kalantzis and Cope (2005) demonstrated, there is also a link between workplaces and the socio-cultural environment in which they operate; therefore, in
order to determine if new learning fulfils the social contract of preparing students for active participation in both contemporary workplaces and new social spaces, it is important to define the features of new workplaces and the socio-cultural environment of knowledge societies to ensure that the learning in schools adequately meets these expectations. The following explores the features of workplaces in knowledge economies as described by the literature.

2.1.1 Contemporary Workplaces

A *knowledge economy* can be described as an economy engaged in continual processes of innovation and creativity to produce symbolic goods and services using information communication technologies for the development and maintenance of consumer markets (Featherstone, 2004). As defined by Castells (1997):

> It is an economy in which sources of productivity and competitiveness for firms, regions, countries, depend, more than ever, on knowledge, information, and the technology of their processing including the technology of management, and the management of technology (p.400).

Workers in knowledge economies are prized for their specialist knowledge and expertise (Alvesson, 2000, 2001; Kolehmainen, 2004; Woiceshyn & Falkenberg, 2008). The value of this knowledge is in a state of continual flux as technologies change, workers need to continually build their expertise to remain employable. In effect, knowledge economies require a culture of lifelong learning to remain competitive.

Accompanying this knowledge fluidity is the growing proliferation of signs and symbols, and the use of multimodal forms of communication to highlight lifestyle differences and to reinforce notions of status and social relationships. Symbolic specialists effectively appropriate the products of different cultural traditions to create new consumer products. Featherstone (2004) describes the emergence of a growing demand for cultural specialists and intermediaries who:

… identify with artists and intellectuals, yet under conditions of de-monopolization of artistic and intellectual commodity enclaves they have the apparent contradictory interests of sustaining the prestige and cultural capital of these enclaves, while at the same time popularising and making them more accessible to wider audiences (p. 19).
Within this emerging group of cultural specialists and intermediaries, Featherstone includes teachers as well as workers in areas such as design, advertising and the media. These specialists are tasked with the responsibility of expanding individuals’ choices by providing them with the knowledge and skills to explore new social and cultural possibilities and of course, new consumer goods.

This has resulted in a shift in the value of disciplinary knowledge with symbolic specialists from the Arts becoming central players in the new economy. Design is a key element in the transmission of knowledge to diverse audiences:

Creativity is an automatic consequence of such action - both in the new combinations of resources and in the inevitable transformations of existing resources in the design and production of the message. Creativity becomes normal and unremarkable in every instance of sign-making. Innovativeness, in the sense of producing ‘the new’, is, equally, an automatic consequence of sign-making: all signs are new, all combinations of resources in the making of a specific message are likely to be new (Kress, 2003, pp. 169-170).

In the process of design, knowledge is appropriated from different disciplines and a range of cultural traditions, and is transformed for a new purpose and a new audience. Creativity and innovation are important features of knowledge economies contributing to the growth in symbolic goods. In schools, this may require a rethinking of the curriculum, moving the Arts from the periphery of the curriculum and aligning them more closely with what schools consider to be their core business, the teaching of literacy and numeracy.

Within knowledge economies the very concept of literacy has changed to one of multiliteracies, encompassing different social languages and multimodal forms of communication (Kalantzis & Cope, 2005). In Lo Bianco’s (2000) description of the contemporary communication landscape the complexity of this literacy environment is revealed:

Languages caught up in the multimodal environment of contemporary communication, which combine verbal linguistic meaning-making with the gestural, visual, spatial, and the radically altered writing and reading regimes of computer literacy, such as oral-like writing and writing-like oralism in voice instruction, complicate literacy practices
with multicultural contexts as the modes, codes and cultural meanings interact with each other (pp.93-94).

In this rich and complex communications environment the Arts and literacy are naturally brought together as people develop new and creative ways to communicate their ideas. Therefore, “literacy education must foster the attitudes and abilities needed to master and use the evolving languages and technologies of the future” (Anstey, 2002, p. 446).

For many people working in contemporary workplaces the concept of ‘going to work’ and the notion of a physical workplace have also changed dramatically as companies create multinational teams to work on complex projects involving high levels of creativity, innovation and problem solving. For these workers, the workplace is no longer a physical space but rather it is a shared virtual place where they collaborate with their international colleagues on these joint projects. These virtual workplaces are often marked by greater flexibility as to notions of time and space, with workers at times using information communication technologies to work from home and to differing schedules to accommodate the needs of teams working across national boundaries and different time zones (Heiskanen & Hearn, 2004). Even within existing physical workplaces, information communication technologies have changed the workplace environment and the relationships within them.

An example of this type of work where workers are not tied to physical spaces but rather operate in a global context, crossing traditional national borders as well as organizational and disciplinary boundaries, is project work. In project work activities are centred on the client’s goals. Fluid partnerships are formed around these goals specifically for the purpose of completing this project. Therefore, with each new project, the project team will change to meet the differing needs of the new client. Kolehmainen (2004) describes some of the key features of these information systems (IS) expert project teams:

A project group usually consists of experts from different competence areas and from different business units, depending on the demands of each commission. Project work indicates functional interdependency and requires both formal and informal interaction and mutual learning among IS experts and between the service supplier and clients as well. IS expert work is based on shared expertise and responsibility for attaining the goal (p.90).
For these project teams, a sense of belonging is created around the shared project goal that is not tied to a physical workplace or even stable work team. In this context, the nature of the physical space is less important than the social space created for the project team. This social space needs to be supportive of the endeavours of individual team members as well as of the collective endeavours of the group as a whole (Monalisa et al., 2008). The structure of this collaborative environment revolves around the explicit articulation of goals and expectations, with shared responsibility for goal achievement creating a personal commitment to group goals. As outlined by Kolehmainen (2004), these teams are also characterised by interactivity and mutual learning, allowing the team to build shared concepts and specialist language that encompasses expertise from different disciplines. These characteristics of the social spaces in which project teams operate and that contribute to their efficient functioning and goal achievement can also be applied to contemporary classroom contexts. These workplace social spaces are designed to support learning, innovation, creativity and problem solving in pursuit of market goals. However, as argued by Warner (2006), schools should also be developing students’ capacities for innovation, creativity and problem solving as well as instilling the concept of lifelong learning necessary in the increasingly complex knowledge environment. It could, therefore, be argued that contemporary learning should also be characterised by explicitness, interactivity, and shared language and concepts.

Similarly to Kolehmainen (2004) in her description of project teams, in outlining the features of virtual teams, Monalisa et al. (2008) highlights the importance of creating a space that supports diverse perspectives, encouraging individual innovation and problem solving. In this space, individuals draw on their personal expertise and networks to meet team goals; thus, there is a strong personal connection to the work. While individual expertise is prized, virtual team members share a common purpose, performance goals and approach. In addition, within effective virtual teams there is a strong sense of trust and mutual accountability that allows for the effective management of risk as workers undertake complex tasks. For Monalisa et al., one of the main advantages of these virtual teams is the capacity to draw on expertise from across the globe to best meet the needs of the project and to harness local knowledge from different markets.

It may be argued that these contemporary project or virtual teams are a direct result of the new knowledge environment. The contemporary knowledge environment is marked by the intensification and complexity of knowledge flows made possible by advances in information communication technologies. It is also characterised by increased knowledge sharing and
appropriation as people work with and build on other’s creative capital. In many ways, it is a collaborative knowledge environment. For Burbules (2004), as people transform spaces through their collective or individual endeavours, they become places. In his terms “a place is a socially or subjectively meaningful space” (p.174). For Gee, these socially meaningful spaces are deemed to be affinity spaces where people with shared interests can interact. These include fan clubs for books, movies, video games and television shows. Within these spaces “people relate to each other primarily in terms of common interests, goals or practices, not primarily in terms of race, gender, age, disability, or social class” (Gee, 2004, p.85). Although Gee considers the concept of ‘belongingness’ as problematic in terms of the relationships forged in classrooms and workplaces as well as virtual spaces, his affinity spaces are clearly social spaces where aspects of individuals’ identities can be engaged in meaningful relationships with others. It can be considered that the individuals interacting in these spaces possess a symbolic sense of belonging within the affinity space, sharing a common interest with other users of the space often accompanied by shared goals, practices, knowledge and language.

The learning environment for students also needs to reflect the shifts in the knowledge environment, skilling them to work in a more fluid knowledge landscape. For project workers, collaboration is often imperative with the team requiring the specialist expertise of different team members for the successful completion of the project. The following description of the nature of knowledge use and production within Gee’s (2004) affinity spaces can also be applied to contemporary project teams:

Intensive knowledge is specialized, extensive knowledge is less specialized, broader, and more widely shared. This creates people who share lots of knowledge, but each have something special to offer (p.85).

Individuals are prized for their specialist expertise and are encouraged to share their knowledge with others, thereby furthering the knowledge of the group as a whole. Roles within the space are fluid as individuals constantly move between the roles of teacher and learner. Similarly, in contemporary workplaces the growing intensification and complexity of the knowledge environment makes collaboration the preferred mode of operation in many contemporary companies, with the realisation that no one individual worker can possess all the necessary expertise to complete complex projects involving problem solving and the development of creative solutions. These fluid relationships can also be beneficial in
contemporary school contexts with both students and teachers sharing their personal expertise. For example, in working with rapidly evolving new technologies sometimes the students may possess greater expertise than their teachers. In an environment where knowledge sharing is the norm, the knowledge of all group members can be harnessed in the learning process with new knowledge and skills spread rapidly through the group as different individuals take on the role of teacher.

The importance of collaboration in knowledge based companies needs to be understood from the perspective of the nature of knowledge in these companies. In these companies, knowledge is a valuable resource that is made available to companies through its personnel, with companies actively competing to attract and retain expert personnel (Alvesson, 2000). Schools can also be considered to be knowledge workplaces where students and teachers use and produce knowledge. The “organizations that craft cultures that welcome and task intelligence not only attract and keep the best and the brightest but also enjoy the competitive edge of next generation innovation” (Buchen, 2006, p.x). The potential for innovation, creativity and effective problem solving is enhanced through the collective endeavours of these expert workers or in schools through the collective endeavours of students.

When companies recruit expert personnel, they are gaining their specialist expertise as well as access to their professional and personal networks in the pursuit of company goals. In the school context, this can be considered in terms of the lifeworld diversity students bring with them into the classroom. However, in order to fully benefit from this valuable resource, companies and teachers need to put in place supportive structures that facilitate collaboration:

For example, Google would not be as successful at problem-solving if it merely recruited a cadre of talented people and left them to their own devices, without the explicit corporate value of knowledge sharing, active nurturing of network resources, and supportive managerial and technical systems the company has established (Woiceshyn & Falkenberg, 2008, p.92).

From these workplace experiences, we learn that even in the adult world of work, collaboration and knowledge sharing do not occur without supportive structures that encourage collaborative work and mutual learning. Just as collaboration is highly desirable in these workplace contexts, it is also valuable to support learning in contemporary classrooms, however, without supportive structures in the classroom its benefits will not be fully realised.
In these new workspaces and ideally in contemporary classrooms, the notion of diversity has shifted from the problematic to the desirable:

Today, the smartest organizations in the world are recognizing that their diversity can be a source of competitive strength. Instead of merely monitoring minority representation within the ranks – a standard goal of diversity programs past – they’re implementing holistic strategies that seek to better understand their employees’ backgrounds, styles, and perspectives, and then leverage them for real business benefits (Park, 2008, p.3).

One of the driving forces behind this shift in attitude towards diversity in the workplace is the increasingly global and diverse nature of consumer markets (Monalisa et al, 2008; Spiers, 2008; Park, 2008). Understanding points of differentiation amongst consumers in order to identify potential new markets for existing products or to develop new products for particular niche markets can provide businesses with a significant competitive edge. Success in any new market depends on an in depth understanding of the cultural context. This is especially the case when expanding into international markets. In the global marketplace businesses compete for consumers by persuading them to identify with differing lifestyles through the use of their brands. In the terms of Edwards and Usher (2000): “The consumer market is one in which difference is the mark of distinction rather than uniformity” (p.27). Reflecting this valuing of diversity in contemporary workplaces, student diversity should also be harnessed in the classroom to enrich the learning of all students and to further enhance an individual’s personal connection to the learning. Points of differentiation amongst students should be used to deepen and widen understandings of issues and open up new areas for investigation.

Within contemporary workplaces, workers are expected to network within and beyond the project team, and to contribute their personal expertise, learning and emerging ideas with their colleagues in the process of creating new knowledge. The professional and personal networks of employees enhance the organization’s knowledge base, providing access to a diverse knowledge pool for the development of innovations and creative solutions (Woiceshyn & Falkenberg, 2008). At the same time, they are expected to invest in their own personal learning to maintain their own value to the organisation. The emphasis is on collaboration although individual specialist expertise is highly prized. The ability of individuals to contribute to the success of the team as well as to highlight their own specialist expertise
within the team become keys to career advancement. For as Alvesson (2001) argues, in knowledge based companies “social relations and personal knowledge sometimes matter as much as or more than market transactions and quality/price-based competition” (p. 875). This would indicate that schools in preparing students for workforce participation also need to focus on the development of relevant social skills such as communication and cooperative skills as well as supporting students to manage their own learning needs.

This emerging work landscape with its accompanying managerial changes has created a need for different workplace structures to facilitate new forms of interaction amongst workers and a demand for workers with a different range of social assets. Kuusinen (2004) contends, “one of the key tasks of knowledge management is to channel the individual knowledge construction accumulated within individuals into shared knowledge processing” (p. 69). In this new environment where knowledge is becoming increasingly shared and shareable, workers need to be comfortable with a more fluid perception of knowledge. In knowledge-based organizations, knowledge is more open to appropriation by a range of individuals and interest groups for diverse purposes and projects. Supportive organisational structures for the sharing of emerging understandings facilitate mutual teaching and learning relationships in the workplace, allowing for greater collaboration among experts from different knowledge communities in the solution of complex problems as they share expertise and effectively teach each other the key understandings necessary for the advancement of joint projects. This also creates a greater fluidity in roles and teams as during their career experts can move between teams both within and outside their knowledge communities, contributing their knowledge in different capacities to a range of projects. Mirroring these working relationships in the school context involves opening up classrooms to greater participation from community members and outside experts as well as greater interaction among different classes and teachers within the school. The role of student and teacher would become more fluid as expert knowledge is sourced from a range of available internal and external experts.

These fluid roles are particularly important in multi-disciplinary teams where specialist knowledge from a variety of fields is needed for the successful completion of projects:

Knowledge work as complex problem-solving within projects characterized by changing commissions, tasks, working communities and even by changing physical places of work is not possible within traditional bureaucratic organizations with direct management control. Instead, it requires a creation of organizational spaces that
supports both autonomous and shared knowledge-creation and learning as well as strengthening the organizational commitment of employees (Kolehmainen, 2004, p.83).

In this context where knowledge is perceived less as a fixed entity weighted with the authority of experts and owned exclusively by set knowledge communities but rather as a shared commodity to be harnessed for the benefit of joint projects, hierarchical organizational structures can prove counter-productive (Kuusinen, 2004). When dealing with complex knowledge, workers and students alike need to feel comfortable with sharing incomplete understandings and emerging ideas. As Kuusinen (2004) contends, this is often not the case in highly bureaucratic organizations and the past educational experiences of many workers also favoured more authoritative notions of knowledge. These more fixed and authoritative conceptions of knowledge run counter to collaborative endeavours where:

A successful group discussion produces a knowledge entity that is more diverse than individual knowledge construction. At the same time, individuals learn shared knowledge, while also individually selecting, interpreting and modifying it in order to integrate it into their own internal stocks of knowledge, clothing it in their own conceptions, integrating it into their own understanding and re-evaluating their own activity according to it (Kuusinen, 2004, p.69).

This would tend to indicate that innovation, creativity and effective problem solving thrive in less authoritarian social spaces. Traditional school environments can be considered to be highly bureaucratic and authoritarian, therefore, in order to create schools that foster innovation, creativity and problem solving, it may be necessary to also explore managerial relationships in the classroom as well as the wider school community. Knobel and Lankshear (2006) maintain that:

“In digital” epistemologies, the conventional epistemological emphasis on “truth” and “justified belief” will often be overshadowed by an emphasis on knowing how to gain and structure attention, how to make novel “moves”, or innovate successfully in contexts where there are few or no established rules and procedures, and how to break rules creatively or invent new rules and conventions (pp.81-82).
An emphasis on student agency in the learning and assessment process may encourage more risk taking in the exploration of new ideas, and the presentation of work in progress and emerging understandings for review and feedback, thus, promoting greater innovation and creativity.

New workplaces characterised by fluid relationships and changing project teams operate on a new management system. In the Australian context, as outlined in an occasional paper for the Centre for Workplace Communication and Culture (Cope et al, 1997), the contemporary workplace no longer operates on conventional systems of authority but rather on a system of employee identification with the mission statements and visions of the organisation. Employee goals are aligned with those of the organisation to generate motivation and productivity. A workplace culture is created where:

Workers are supposed to buy into the vision and mission of the organisation, to take on corporate culture, to be the corporate person. Culture, in fact, has become a powerful new management technique, the glue that holds the new organisation together, replacing the glue of the highly structured system and order which held together the old workplace. It’s all about winning employee commitment by setting up systems of belonging …(Kalantzis & Cope, 2005, p.18).

This management approach is often met with varying degrees of success depending on the prestige of the company and the status association which this company affords its employees.

Alternately, companies may operate on a system of cultural matching whereby employees self-select their membership of a company along with its values, norms and practices (Alvesson, 2001). Organizations provide prospective employees with realistic job descriptions on which to base their decision to join the company. Through this process of cultural matching the employee decides that they belong with a particular company. Within this system, workers maintain their employment relationship for as long as they continue to share the organization’s goals and as long as their expertise is needed by the organisation. Ultimately, this leads to a greater commitment to individual careers as opposed to commitment to a given organisation leading to greater worker mobility as they seek change and better opportunities. This also contributes to a culture of lifelong learning as workers strive to maintain their marketability in an ever-changing knowledge environment.
Central to both these management approaches is a sense of belonging on the part of workers even if this is a transient state. Another key characteristic of both these management approaches is **explicitness** either in relation to the overall vision of the organisation or the goals and expectations of the company. From the perspective of companies, there is a strong desire to create a sense of belonging to the company to maintain employee loyalty as for knowledge based companies their greatest asset is often their employees. Alvesson (2000) contests that:

In order to increase the likelihood that employees are loyal to the company, top management tries to reinforce social identities associated with corporate membership. The employees are supposed to identify with their organization (p.1108).

This process of identification with companies also constitutes a type of managerial control mechanism in work contexts where employees are expected to operate on the basis of their knowledge and judgement with minimal direct hierarchical supervision. Potentially, this concept of using the explicit articulation of goals and expectations as a management strategy can be applied in classrooms. Once students understand the learning goals and the performance measures, accountability for the achievement of learning goals shifts largely to the students. In workplaces, this is often the case in knowledge intensive organizations with highly skilled workers dealing with complex knowledge and problem-solving tasks. Within these contexts workers are often active, autonomous agents in the creative, problem-solving processes of the project team. This is a shift from traditional capitalist forms of production where “workers merely execute the conceptualisations of others; their employers, foremen and managers” (Zou & Trueba, 2002, pp.63-64). The workers in project teams are contributing their intellectual capital to the collective endeavour. If we consider it desirable that students learn to work with complex knowledge to problem-solve and to produce innovative and creative knowledge products, then they need to be given opportunities to be active participants in the learning process.

In these knowledge intensive organizations, notions of control, supervision, evaluation and feedback become problematic. Beyond the achievement of client goals and the production of tangible knowledge products, Alvesson (2001) argues that it is often difficult to evaluate expert knowledge and its impact on the productivity of a company. Therefore, the social relationships and image projected by employees become increasingly important in maintaining the employment relationship:
In the rather extreme ‘people-intensive’ organizations that many knowledge intensive companies may be said to be, systems, structures, technologies and products matter much less than what the personnel do and, in particular, how they impress clients, partners and others. Marketing and production are heavily sensitive to the identities of the personnel (Alvesson, 2001, p.878).

In this environment of minimal direct supervision and a level of ambiguity as to the value of employees’ inputs, a strong sense of personal professional identity is important as well as the ability to assess personal contributions to the achievement of project goals. From the perspective of students in classrooms, if they are to be given greater agency over their learning as well as accountability for goal achievement, they need to become skilled in evaluating their own performance.

Frydenberg, Ainley and Russell (2005) in their work on student engagement found that students were more engaged when they had greater agency over their learning, that is, when the learning was “…designed to involve them in making decisions about the planning, implementing, reporting and assessing of work, allowing some autonomy and control…” (p.10). Recognising their contributions to collaborative endeavours is important for employees’ and students’ sense of work satisfaction and enhances their commitment to the work although not necessarily to the company or school. Importantly, employees also need to project an image of competence and expertise to their employers and clients to maintain their value to the company as client satisfaction can often be used as a marker of success in the absence of other performance measures. For students, this may be translated as greater confidence in their own abilities, creating an image of capability. This self-confidence resulting from a better understanding of expectations and greater agency in the learning process can minimise a form of student disengagement, ‘learned helplessness,’ that is associated with low levels of confidence (Frydenberg et al., 2005).

Although workers have greater agency over their own work within these new collaborative contexts, there is also greater accountability for the achievement of project goals and the effective functioning of the project team. With the relaxation of direct controls over employee behaviour and outputs there is a greater emphasis on internalised social controls. This can be viewed as a part of the informalization process described by Featherstone (2004):
The less strict canons of behaviour and relaxation of codes that accompanied the informalization process demanded that individuals show greater respect and consideration for each other as well as the ability to identify with and appreciate the other’s point of view (p. 45).

Organizations actively promote notions of professional codes of practice encouraging employee identification with a set of company or profession specific norms and values, thus, facilitating the efficient operation of project teams and promoting worker productivity. Similarly, in schools these types of codes of behaviour are important if students are to take greater responsibility for their own learning and their interactions with others, thus, replacing more punitive forms of behaviour management. In Alvesson’s (2001) terms, these internalised norms and values influence workers’ professional identities and from the perspective of the employer act as a control mechanism by “making an impression on how people see themselves is one way of safeguarding what are deemed to be suitable priorities and efforts” (p.878). In effect, the internalised professional standards of employees act as a form of consensual control over their behaviour and work ethic, leading voluntarily to longer working hours and commitment to the achievement of company goals. Although schools would not necessarily be seeking longer working hours from their students, a greater commitment to the achievement of learning goals as well as self control over both social and work behaviours would be considered highly desirable.

With the rapid advances in information communication technologies, the knowledge environment of contemporary workplaces has changed dramatically. These new technologies have opened up possibilities for greater collaboration amongst workers from across the globe, bringing their specialist knowledge and cultural expertise from different consumer markets to the completion of joint projects. They have also created new opportunities for interdisciplinary collaboration as specialists from different fields come together to work on complex problem-solving tasks. These new knowledge workers share a symbolic sense of belonging, however transitory, revolving around the completion of the given project on time and on budget. While working on the project they share a common purpose and goals, building a shared language and knowledge base from which to draw as they solve complex problems associated with it. In knowledge-based organizations, the hallmarks of success are innovation and creativity, resulting from the collaborative endeavours of their workers. The ability of our children to operate in these complex and intense knowledge environments with diverse collaborative teams, in the production of innovative and creative knowledge products
and the solving of complex problems, will determine their future success in the competitive marketplace of knowledge-based industries.

### 2.2 The Contested Ground of New Learning

In this rapidly changing technological and socio-cultural environment, schools cannot remain unchanged. Just as workplaces have evolved with the technologies, the ways people interact socially have also been transformed by the technologies with the new social spaces created for entertainment and social networking. The lives of children living in knowledge societies have not remained untouched by these changes. On the contrary, Yon’s (2000) description of the ever increasing possibilities for identity construction based on multiple diverse affiliations is also applicable to children, with popular culture introducing children to influences beyond the family, their immediate community and the schools they attend. The diverse dispositions, experiences, interests, expectations and aspirations of children entering our schools today reflect the increasing diversity within society as a whole.

For education to be meaningful and engaging to students it needs to connect to their world and the world beyond the school gate. Students need to see the relevance of education to their understanding of the world and their aspirations for the future. In 1999 Tapscott optimistically declared:

> Digital kids are learning precisely the social skills required for effective interaction in the digital economy. They are learning about peer relationships, team work, critical thinking, fun, friendships across geographies, self-expression, and self-confidence (p.8).

To some degree Gee (2006) would agree with this educational potential of computer games and other virtual communities where participants congregate around shared interests and goals. However, at the same time concerns have been raised about the drive to meet the expectations of future employers through the teaching of new literacy skills, encouraging students to work cooperatively to design and analyse symbols (McLaren, 2005). Monahan (2005) echoed this concern stating, “the cultivation of technology literacy skills by students can be perceived as supplying a flexible and docile work force for low-end service-sector jobs in the city” (p.6).
Accompanying these issues, concerns have also been raised about falling levels of achievement in literacy even in a relatively high performing jurisdiction such as the ACT where according to the Programme for International Student Assessment (PISA) “in each literacy domain, the average achievement scores of students in the ACT is the highest in Australia” (Thomson & de Bortoli, 2008, p.2). Adding to the discussions on student achievement, the ACT’s 2000 PISA results provided interesting evidence on the link between student engagement and literacy performance. The research found that in the ACT student engagement levels impacted more on students than gender or socio-educational status (Frydenberg et al., 2005). This finding opens up the possibility that in the changed technological and socio-cultural environment of contemporary classrooms, new influences may be at play that are equally or potentially more important than gender and socio-economic status in their impact on student performance. Perhaps in contemporary classrooms, just like in Gee’s (2004) affinity spaces, shared interests, goals and practices play a greater role in people’s participation than gender, social class or even age.

Gallego, Rueda and Moll (2005) have also expressed concern about the patterns of under performance of students from linguistically and cultural diverse backgrounds in America and the deficit theories used to explain this under-performance. These theories attribute the cause of this under-performance to individual characteristics of the child and their family or community. Examples of these characteristics include low intelligence and lack of motivation as well as poor linguistic and high order thinking ability. To these we can also add socio-economic and ethnic background among other socio-cultural attributes. Gallego, Rueda and Moll (2005) are concerned about the traditional standardised measures used to differentiate between students and the subsequent labels used to categorise students in these deficit theories:

Indeed, the long-standing pattern of underachievement among students from linguistically and ethnically diverse cultural groups is especially troubling because it often results in stigmatising educational labels, placements in low-level educational tracks (including special education), diminished educational expectations, and other negative educational consequences (pp.2299-2300).

Instead of focussing on supposed individual deficits, Gallego et al advocate a closer examination of the nature of schooling itself and the way it is experienced by different
individuals, noting that there is great diversity between classrooms and the way that even standardised curricula are delivered to students.

In this contradictory climate of hope and fear, the reality remains that education needs to be re-envisioned to meet the demands of an efficient knowledge economy engaged in the production of creative and innovative symbolic goods for global markets. To meet this demand knowledge-based economies require a diverse workforce with the skills to work collaboratively on complex projects. Darling-Hammond (2006) highlights this educational imperative:

No society in a knowledge-based world can long prosper without supporting a thinking education for all its people. A societal infrastructure disintegrates, both economically and socially, when large numbers of individuals cannot become productive citizens (p.15).

The implications of not adequately preparing individuals for this new world of work are considerable, impacting on their future well being both socially and economically. The following examines the contested ground of new learning identifying the features of new learning considered to be important in meeting the needs of new learners and their future employers.

2.2.1 A Childhood of Choice

The students in our classrooms today, are already living in a world saturated with new technologies and expanding information access. In the eyes of business, they constitute a consumer group in their own right. Children living in these knowledge economies are often caught in a clash of cultures between the global consumer culture and the culture of the school. The world of consumer culture is marked by a seemingly endless array of choice. The influences of consumer culture pervade their choices in clothes, food, music, toys and entertainment. Kenway and Bullen (2005) argue that children’s lives and identities are essentially being commodified:

Consumer-media culture increasingly provides the means by which people take up their identities and interact with the world. Desire here is a “lack” that the individual seeks to fill through consumption, but which can never be satisfied. This is perhaps
nowhere more evident than in the children’s market and in young people’s consumption practices, where one fad or fashion rapidly succeeds another (p.35).

Within these social spaces, the child is an active agent making choices about their participation in these environments and how they construct their identities. Unfortunately, in these spaces this often occurs without the guidance of significant adults in the children’s lives. This can lead to a false sense of empowerment leaving children open to manipulation by various corporations and interest groups. For Kenway and Bullen (2005), the danger lies in corporations becoming society’s most successful teachers unchecked by counter perspectives that support children to develop the critical skills necessary to make genuinely informed choices.

In contrast, traditional schools are largely spaces created by teachers: “This is the adult-controlled formal school world of official structures: of timetables, and lessons organized on a principle of spatial segregation by age” (Valentine, 2001, p. 142). Valentine argues that in schools adults control both time and space, and adult control is even exerted over the children’s bodies through routines such as lining up and requests for appropriate listening behaviours. Schilling (1993) links schools’ endeavours to control children’s bodies as well as minds to Bourdieu’s work on cultural capital contending that this type of social control maintains society’s status quo. Schilling argues that “… the capacities and senses, experiences and management of bodies are not only central to the exercise of human agency and constraint, but also to the formation and maintenance of social systems” (Schilling, 1993, p. 22). Further, Bourdieu and Passeron (1977) contend that schooling favours those students who already possess, through their socialisation in the home, school-valued cultural capital.

Knobel and Lankshear (2006) share the view of traditional schooling as one which is bound by the walls of the classroom and the constraints of the timetable and curriculum where all students in the class are engaged on the same task at the same time. They consider this to be an alien environment for children of the digital era who are accustomed to greater flexibility of time and space, often interacting simultaneously in different places, both real and virtual, on multiple tasks. However, they also acknowledge the difficulties faced by teachers in this period of transition from traditional schooling to new learning:

This can be a tension for teachers as well, when they want to support and promote students’ agency but at the same time feel bound by curricular and reporting
requirements that define literacy as encoding, decoding, and comprehension of conventional texts and curriculum delivery as an orderly progression through an official program of topics and tasks (Knobel & Lankshear, 2006, p.82).

In effect, these teachers are caught in the middle of competing needs and priorities, attempting to satisfy the demands of both students and administrators. Unfortunately, in the process they are probably not succeeding in fully satisfying the demands of either party.

In traditional industrial era schools, adults mediated children’s choices, with teachers providing them with ‘appropriate’ options from which to make their selections. In Popkewitz’s terms, these schools were designed “to rescue the child so that the child can become an adult who is self-disciplined, self-motivated, and a productive participant in the new collective social projects of the day” (Popkewitz, 2000, p.162). A distinct hierarchy was evident in the teacher student relationship in these schools based on age, with the adult considered to possess greater knowledge and therefore, more power in the relationship. In the traditional world of the school, the emphasis was on control rather than student agency, where learning was a passive activity rather than an active one, marked by uni-directional knowledge flows with knowledge passed from teacher to student. In these learning environments:

Knowledge was definitive. The direction of the knowledge flows was top-down. The moral lesson was to accept authoritative, universal knowledge as true and to comply with its 'discipline’ (Cope & Kalantzis, 2007, p.77).

This type of schooling fulfilled the needs of the industrial era with factory owners seeking a compliant workforce willing to engage in menial tasks with limited work satisfaction. Matthews (1980) argued that this type of schooling effectively emulated the conditions students would later find in the workplace. The emphasis in these education settings was on competition rather than cooperation with extrinsic rather than intrinsic rewards that were distributed unequally. The teacher strictly controlled the learning process and conformity to rules was valued.

Cummins (2001) argues that traditional schools mirrored the patterns of exclusion and devaluing of diversity of the wider society in which they were situated. Within this power structure student under-performance was equated with individual student deficits rather than
with any characteristics of the institutions. For schools and teachers, difference was considered problematic and the diverse cultural resources of students were devalued. Instead he advocates:

Curriculum and instruction focused on empowerment, understood as the collaborative creation of power, start by acknowledging the cultural, linguistic, imaginative, and intellectual resources that children bring to school (Cummins, 2001, p. 653).

Lo Bianco (2000) provides a good example of the type of missed opportunities that occur in traditional school settings where student resources are squandered drawing only on the cultural capital of the mainstream community:

This squandered bilingualism is the direct result of the inability of education systems to comprehend the intellectualisation of a potential bilingual skill. Many children utilise complex literacy awareness and talent daily; literacies which invoke ethnic, ideological, religious, script, technical and nation-identity statuses (Saxena 1994) in a marketplace of authorised, traditional and hybrid forms. Like spoken language, diversity in the plural literacy practices of minority children is relegated to the margins of their lives. Yet they have within them the power to open up new intellectual worlds which are, at the moment, linguistically and intellectually closed to us (pp.100-101).

Languages encapsulate valuable ways of knowing and being in the world which are the building blocks of further knowledge creation. From the perspective of contemporary global knowledge-based organizations, we can ill afford such a squandering of the valuable resources that diversity provides both in educational and workplace settings. For today, diversity represents a competitive advantage in the global marketplace. If as Gaudelli (2003) argues, “the manner in which teachers taught was influenced both by the social categories apparent among students and by the teachers’ own sense of self” (p.100), then the learning would reflect a genuine collaboration between the teacher and the students. This would produce meaningful learning that reflects the students’ developing social identities and not only the teacher’s social identities.

Kenway and Bullen (2005) argue that many students today, working in these traditional classrooms that reflect the past industrial era, are “dissatisfied, disengaged, disaffected, disrespectful, and disruptive” (p.31). The role of the student in the learning process is central
to understanding these issues of student alienation and disengagement. Learning can be considered to be the work of the student. Satisfaction and engagement in the learning process is enhanced when students have a degree of control over the learning process and a sense of ownership over their own work. Marx’s theories on human motivation provide insights into student engagement with work satisfaction linked to “conceptualisation of production, control of the tools and resources used for work, and control of the product” (Carspecken, 2002, p.63). In Morrow and Torres’ (2002) examination of Freire’s work, they outline an approach to learning that balances the roles of the teacher and student. In Freire’s approach, teacher direction or guidance supports the active endeavours of students in the learning process as new knowledge is produced “based on the experience of learners in revising their own self-understanding” (Morrow & Torres, 2002, p.46).

In the school context, a lack of control over the learning process can manifest itself in disruptive behaviours for as Carspecken (2002) elaborates:

> When goal-oriented tasks are controlled by others, are menial, fragmented, and do not facilitate self-expression, then people will develop cultures that try to maximise what few opportunities for self-expression do exist in the tasks themselves…and simultaneously meet praxis needs by resisting cultural forms associated with the authority figures of the setting: teachers, foremen, employers (p.63).

The lack of personal agency, whether in the school or workplace, can lead to intense feelings of dissatisfaction and alienation from the social setting. In essence, the students or workers do not feel a sense of belonging. The frustration associated with a lack of control over one’s work is further corroborated by quotes such as the following from a thirteen-year-old boy:

> ‘My English teacher wants me to write about my feelings, my History teacher wants me to give my opinions, and my Science teacher wants me to write on my views about the environment! I don’t know what my feelings, opinions and views are, and I can’t write about them. Anyway, they’re none of their bloody business! I hate school!! I only wish I could write about the things I’m interested in like sport and military aircraft’ (Rowe, 2003, p.11).

This student makes his feelings, opinions and views about school abundantly clear. It is easy for the reader to sense the student’s frustration and sense of alienation. In effect, students such
as these feel disempowered in the learning process occurring in traditional classrooms. These classrooms fail to engage the students’ identities and to involve them in the knowledge creation process. As Warner (2006) contends “industrial era schools do not have the culture to develop creative, innovative and entrepreneurial young people as a major outcome of their schooling or indeed as being central to their learning processes” (p. 49).

This is a different world to the world of affinity spaces where participation and relationships are negotiated around specific goals and interests (Gee, 2004). Frydenberg et al. (2005) in their review of the research on student engagement determined that for a task to be engaging to students, it needed to be interesting, challenging and important. In their terms, the task must be open to discovery with achievable goals and lead to something of value. However, they also acknowledged “there is wide variation in students’ perceptions of what is interesting, challenging and important” (Frydenberg et al., 2005, p. 7). For today’s students, knowledge itself is no longer considered definitive but rather as something to be worked upon to create new knowledge products. The expectation of students accustomed to active participation in affinity spaces is to be active participants in the process of knowledge creation in the classroom. This approach to learning itself appears to be beneficial to student learning.

Frydenberg et al. (2005) deduced that students who focus on understanding and mastery perform better than those who focus on memorization and rote learning.

Children accustomed in their leisure time to interacting in these new social spaces as active agents in the decision-making process tend to expect this same creative freedom in the classroom. The desire for creative expression does not change once children enter the classroom. Unfortunately, the opportunity to exercise this creativity may be diminished by the learning design and even in some cases by the design of the physical space when new technologies are introduced into classrooms. Monahan (2005) argues, “ironically, in the name of flexibility, students, teachers and even administrators must adapt to conditions of increased rigidity, with fewer avenues for innovation, interpretation, or expression” (p.11). Monahan advocates a more balanced power and accountability structure open to change and greater participation by all key players in the system that supports individual action and expression.

Ritchhart (2007) also advocates greater student agency in the learning process. As one of the seven characteristics of a quality curriculum he includes learner independence, that is, a curriculum that provides opportunities for students to make decisions and to direct their own learning. For Ritchhart (2007):
This means that learners must necessarily be able to spot occasions for the use of their skills and knowledge in the moment and make appropriate choices, and follow through with application. Too often schoolwork leaves students with few choices and strips them of opportunities to make the decisions that meaningfully shape learning and lead to a sense of accomplishment. Rather than engaging in deep learning, students merely complete work (p. 40).

By making choices about how they apply their understandings, students develop a greater sense of ownership of the learning process itself. In effect, the learning becomes personal. Ritchhart further contends that this also encourages greater learner independence as learners largely direct their own learning. However, during this process teacher support also needs to be readily available to enable learners to explore more challenging options that extend their existing competencies. As students work on more challenging learning activities, the risk of failure can be daunting for some students. Therefore, an effective learning design operates at what Vygotsky (1962) termed the proximal zone of development of the students where scaffolds are provided to assist students to achieve their learning goals.

An emerging area of interest for educational researchers is the use of computer games in learning to shift the balance of agency to students. This area captures the imagination of some educators as computer games form a part of many children’s lifeworld experiences and act to engage students in the learning process. These games are also often designed in such a way that they scaffold the students learning as they progress through the game, gradually increasing the challenge at each stage. However, like many aspects of new learning it is problematic. On the surface, computer games appear to resolve problems of student engagement and alienation but used on their own their efficacy in providing the learning necessary for the knowledge workers of the future is questionable. The effective use of computer games as well as other media resources in the learning process involves the development of an effective overall learning design. The example described enthusiastically by Visscher (2006), involved the use of a computer game to motivate students to write:

Fifteen children between the ages of 9 and 11 are staring at the computer screen, mesmerized, as the adventure game Myst III: Exile is played … Once more he manoeuvres his cordless mouse to guide the cursor along the dark walls of a hollow mountainside. Rylands then tells his students, “OK, now write down which way we
should go to get to the ladder. What do you come across? What do you experience on your journey?" The only sound you hear is the furious scribbling of pencils (p. 1).

The ability of this award-winning teacher to engage his students is evident. Unfortunately, this article leaves many questions unanswered about the actual learning design. For example, it does not describe the writing goals of the lesson and the teaching involved in supporting these students to achieve these specific writing goals. The article describes the motivating nature of the gaming experience and the culminating activity. However, the intervening teaching between these stages is not described, posing the question of how much these students actually understood about the writing process itself and how to engage their audience.

Within the new media environment the whole notion of literacy has changed from one tied to print to one of multiliteracies with Anstey (2002) arguing that the term literacy only refers to language whereas:

> Being multiliterate requires not only the mastery of communication, but an ability to critically analyse, deconstruct, and reconstruct a range of texts and other representational forms. It also requires the ability to engage in the social responsibilities and interactions associated with these texts (p.446).

This richer definition of contemporary literacy practices encompasses the variety of multimodal texts made possible through developments in technologies and multimedia practices. In contrast, in describing traditional schools, Cope and Kalantzis (2007) depict an environment where learning is compartmentalised:

> Heritage modern schooling divided modes of meaning neatly into different subjects. Language was for text; art was for visuals. Schools stripped away the richly multimodal life of pre-school children by separating off the mechanics of handwriting or phonics (p. 78).

This type of learning does not reflect the realities of children’s lifeworld experiences. Multimodal forms of communication abound in the students’ lifeworlds from television to computer games and the internet. Today’s children on entering the classroom have already
spend considerable time interacting with a range of multimodal texts. Luke (2003) points out that:

Multimodal readings and experiences of the world begin in infancy and constitute the social practices in everyday life. In fact, the classroom is one of the few places where formal taxonomic categories (e.g., the curriculum) and the official partitioning of time and space (e.g., the timetable) often are used to discourage children from blending, mixing, and matching knowledge drawn from diverse textual sources and communications media (p. 398).

For these digital natives, it is unrealistic to expect them to be patient with a learning design that does not incorporate learning about these multimodal texts concurrently with print media. Luke (2003) advocates classroom pedagogies that more closely match the real world practices of contemporary workplaces, homes and communities. In effect, schools should be building on the knowledge children have gained through their lifeworld experiences and use this a starting point for building new learning rather than imposing artificial constraints on the way contemporary children use and produce knowledge.

However, Jenkins et al. (2006) maintain that conventional literacy practices are also essential for full participation in contemporary cultural contexts:

Much writing about twenty-first century literacies seems to assume that communicating through visual, digital or audiovisual media will replace reading and writing. Before students can engage with the new participatory culture, they must be able to read and write (p. 19).

The continuing importance of reading and writing cannot be disputed although it may be argued that children begin to engage with a variety of modes of meaning prior to becoming fully print literate. This exploration of a range of text types can be considered to enrich their understanding of texts, generally including their design, purpose and audience. In the earlier example of computer games in the classroom (Visscher, 2006), the potential of computer games for literacy learning may not have been fully explored; however, it is evident that the literacy associated with computer games can be used to draw comparisons with the conventions of print narratives in building students’ understanding of both genres.
An important contribution of Jenkins et al (2006) to the debate on new literacies is the recognition that “the new literacies almost all involve social skills developed through collaboration and networking” (p. 4). These skills include negotiation, collective intelligence, appropriation, judgment, multitasking and play among others. For Jenkins et al, the new literacy environment is a communal one with an emphasis on community involvement rather than on individual expression. As a result, there is recognition that new media alone is not sufficient to ensure effective learning; an effective learning design exploring these new literacies and accompanying social skills is also necessary. Luke (2003) would concur with this perspective arguing that the pedagogical emphasis should be on knowledge and learning rather than on the technology. For Luke (2003), “computers and connectivity are but one resource among a platform of knowledge and communication sources that support, rather than drive, a critical, learner-centred constructivist pedagogy, and teachers remain an indispensable component in this mix” (p. 399).

Gee (2004) and Lankshear and Knobel (2006) share this view of the digital world as one characterised by collective intelligence and distributed expertise. Collaboration and knowledge sharing feature significantly within the new cultural spaces of the digital world created for work, learning and play. Despite their limitations as a stand-alone learning medium, much can be learnt from students’ experiences in using computer games and when used as a part of an effective learning design, well designed computer games can form a valuable part of the learning process. Gee (2006) argues that the skills associated with playing computer games where individuals share common goals and utilise the specialist knowledge of individuals to achieve these goals are important in both contemporary workplaces and social movements. He explains that in computer games, children are actively involved in co-creating the environment they are navigating. From an educational perspective, this *interactivity* is important as “all deep learning involves learners feeling a strong sense of ownership and agency, as well as the ability to produce and not just passively consume knowledge” (Gee, 2006, pp.10-11). This creates a greater sense of satisfaction and engagement with the learning process. It is also through this sense of empowerment or agency that students can manage the element of risk in their learning. When they are in control of the production process they are more likely to take calculated risks with their learning to develop more creative solutions to problems and to engage in evaluation of their own efforts.

However, the ability to create these learning spaces, which engender a strong sense of belonging and agency are not limited to the designers of computer games. Similar
communities of practice can be created in different learning spaces. Pianfetti (2007) envisages the Generation ‘I’ classroom as a place of “paperless homework, school to home portals, ebooks, online learning and ubiquitous access to resources” (Pianfetti, 2007, p. 88). For Pianfetti, this is a context-rich environment in which inquiry-based learning can flourish. Within these spaces, in addition to computer games other forms of social software open up new possibilities for greater collaboration among students in the creation of knowledge. Martino (2007) defines social software as:

… a set of tools, which enhance our ability to communicate and to collaborate. These tools facilitate social connection and the exchange of information and also help to build an ecological framework (that is an open, complex, and adaptive system containing features which are dynamic and interdependent) within which knowledge creation and new forms of teaching and learning can emerge (p.38).

Included in this category of socially interactive software are blogs and wikis as well as sites such as MySpace, YouTube, Second Life and Flickr. These interactive environments open up exciting possibilities for global collaboration among students engaging in joint projects and working to create new knowledge that can be widely shared. These spaces open up possibilities for new creative learning designs. Through these technologies, students are able to access cultural resources across national borders as they seek to better understand their own and others perspectives, thus, enhancing their global competitiveness in work environments which also often involve cross border collaborations and markets. Although teachers may not be cultural or language experts in a given context, they can still design learning which provides opportunities for their students to access and explore these cultural resources to enhance their learning and the learning of others. Martino envisages the possibility of textbooks being replaced by living documents collaboratively created by students engaged in a process of writing, peer review and editing. Martino’s (2007) position on new learning is clear; it “emphasises active rather than passive learning, collaboration rather than individualism and utilises advances in media and technology (e.g. social software) to enhance educational outcomes and experiences” (p.39). For Martino, the future success of our students depends on their ability to work effectively in these new social and technological environments.

Interestingly, for Burbules (2004) the qualities of interest, involvement, imagination and interaction that create a sense of immersion in learning are not restricted to technological
learning spaces. He argues that a virtual learning environment with this sense of immersion can be created through other modes of teaching and that all these modes share equal validity and authenticity. For Burbules (2004), the essence of creating effective learning spaces is that they are “spaces where creativity, problem solving, communication, collaboration, experimentation, and inquiry can happen” (p. 169). Through an understanding of the qualities that make technologically mediated environments appealing to children, it may be possible to replicate these qualities in other environments. Effectively, this is the challenge for teachers in designing new learning spaces that engage children of the digital generation.

Restoring agency to students in the learning process does not remove agency or responsibility from teachers. The learning relationship has changed to a working collaboration. In the context of new learning, Warner (2006) has suggested a move towards a student-centred environment advocating greater freedom and customisation of learning arguing that “it allows students to tap into the talents, knowledge and wisdom of teachers while being given the environment to pursue the areas in which they have a high degree of aptitude” (p.58). Although student centred approaches are in use in schools worldwide including Montessori schools, it may be argued that new learning requires an even more subtle distinction in the relationship between students and teachers. It requires a learning centred approach with students and teachers focussed on the achievement of mutual goals with a greater flexibility in roles.

Bouillion (2007) describes the concept of third space, a space where the interests of teachers and students overlap. The negotiation of these spaces is problematic to ensure a balance between the interests, knowledge and practices of each group. In order to achieve transformation the teacher needs to design learning, which challenges students to explore new knowledge rather than to remain in their comfort zone. After all, one of the most powerful roles of the teacher is opening up new worlds and choices for our students. They are also charged with the responsibility of ensuring the learning design supports students to contribute to and succeed in the collaborative endeavours of the group. However, the learning must also reflect the interests and aspirations of the students to ensure relevance and to maintain student engagement in the learning process. The concept of a third space, a learning place with greater role flexibility and a sense of shared purpose, reflects the ideal learning environment in which the interests of both groups are addressed.
2.2.2 Teachers as Designers or Cultural Intermediaries

Although there is considerable discussion about the educational potential of computer games and other interactive sites, there still appears to be widespread agreement that teachers play a significant role in the education of children. Much of this discussion centres on teacher quality and student performance with a cautionary note from Luke (2004):

Teachers and teaching become the objects of scrutiny and critique right at key junctures of social, economic, and cultural change…Teachers and teaching get blamed for everything from deteriorating physical plants and eroded funding of schools, changing family structure and community social relations, youth unemployment, to changes in identity and dominant technologies for intellectual formation and cultural expression (pp. 1423-1424).

Undoubtedly, during this period of rapid technological and socio-cultural change, teachers have to some degree felt under siege from a variety of sources including students, parents, educational administrators, politicians, the media and employer groups with their at times conflicting agendas. However, at the same time teachers themselves also recognise the important role they play in the education of children as highlighted by Rowe in his 2003 review of research on educational effectiveness which determined that “the quality of teaching and learning provision are by far the most salient influences on students’ cognitive, affective, and behavioural outcomes of schooling – regardless of their gender or backgrounds” (p.1). Watson (2005) concurs with this finding stating that teacher expertise in subject content, teaching and learning correlate with student performance.

Contributing to this debate on teacher quality, Darling-Hammond (2006) in her examination of US schools observes that “…schools in most other high-achieving countries ensure that teachers have time – generally 10 to 20 hours per week – for collaboration, collective planning, lesson study, peer coaching, developing curriculum and assessments, and jointly examining student work” (p.21). This direct investment in teacher quality by providing time for teachers to engage with their colleagues in professional activities that impact on student learning in the classroom highlights the importance placed on the role of teacher in the learning process in these countries. In exploring the complex issues of teacher quality and student performance, Darling-Hammond moves beyond the narrow characteristics of individual teachers such as content knowledge to highlight the effective features of quality
teaching designs. She describes a **challenging curriculum** where teachers “engage in learning and assessment that require students to construct and organize knowledge, consider alternatives, apply what they are learning, and present and defend their ideas, rather than focussing largely on multiple-choice tasks” (Darling-Hammond, 2006, p.21). For Darling-Hammond, this is a thinking education that engages students in meaningful learning.

The emphasis on teacher quality is also reflected in Vickers and Singh’s (2005) concerns about the increasing levels of monitoring of teacher performance:

> Around the world, teachers’ work is increasingly constrained by a web of evaluations. While some of this may be necessary, it does lead to a loss of creativity in the face of standardised monitoring, and a loss of productivity as teachers’ energies are absorbed by regular assessments and appraisals throughout their professional careers (p.233).

Within the context of the changing role of the teacher in new learning, the value of teacher performance assessments and evaluations will depend largely on the development of a clear understanding of these changes in the teacher’s role. To contribute to teacher effectiveness and professional understanding, the evaluations must closely match the role of the teacher in the new learning context otherwise, as argued by Vickers and Singh, they will only act to reduce teacher creativity and productivity.

With the growing proliferation of symbolic goods used as markers of identity, lifestyle choices and social relationships, and the consumption of mass culture through a variety of forms of media the concept of education is rapidly changing. Luke (2004) describes the effect of this ever increasing diversity on schools:

> Schools across national and regional jurisdictions in North and West, South and East are still struggling to contend with cultural and linguistic diversity, and, now are attempting to deal with the epistemological diversity affiliated with popular media, world youth cultures, and new technologies (p. 1425).

The impact of these changes on the role of the teacher is still not totally clear. However, Luke argues that this increasing diversity has led to an intensification of teachers’ work as they try to manage this diversity. This includes added planning and preparation of lessons and materials to cater for individual student needs as well as the development of specific
behaviour management plans. The increasing workload of teachers is further compounded by school and system accountability requirements.

In this environment of increasing diversity, Featherstone (2004) envisaged teachers as belonging to a new class of cultural intermediaries who “do not seek to promote a single lifestyle, but rather to cater for and expand the range of styles and lifestyles available to audiences and consumers” (p.26). This new class also included specialists working in areas such as the media, advertising and design as well as counselling. This new role is consistent with the traditional role of teachers as mediators of content knowledge and is one of the characteristics often associated with teacher quality. However, teacher content knowledge alone is not sufficient to ensure quality performance outcomes for students.

Although the goal of promoting diversity in the school context by enabling students to explore others’ identities and develop understandings of the different worldviews they bring to learning situations is a desirable one, it requires a sophisticated learning design that does not position the teacher as a cultural expert. Gaudelli’s research (2003) highlighted the pitfalls of teachers attempting to present themselves as cultural experts on cultures other than their own. This included the danger of perpetuating cultural stereotypes and increasing students’ feelings of their cultures being misrepresented and misunderstood. He advocates:

… a curriculum that seeks to prepare students to live in a progressively interconnected world where the study of human values, institutions, and behaviours are contextually examined through a pedagogical style that promotes critical engagement of complex, diverse information toward socially meaningful action (Gaudelli, 2003, p. 11).

This implies a view of the learner as an active agent with the ability to respect others’ perspectives. This places greater emphasis on the role of the teacher as a designer of learning to develop in students the necessary thinking and communication skills to engage in this cultural exchange.

There is also the new pitfall of teachers setting themselves up as cultural experts in the various permutations of popular culture. In our attempts to connect to the lifeworlds of the student it is tempting to use the readily available resources of popular culture to engage students in the learning process. However, in using these resources the learning design must allow for the expertise of the students to be used in the interpretation of these cultural forms.
It is also important not to assume knowledge or interest in given products of popular culture for as Cazden (2006) notes:

Items from popular culture (music, TV, films) are frequently recommended as a resource for heightening the lessons ‘relevance’ and ‘significance’, but those very resources will be unhelpful, and may even contribute to a feeling of not ‘belonging’, for those students to whom they are unfamiliar (p.21).

Cultural interests and affiliations are rapidly diversifying and it cannot be assumed that all students are interested or conversant with the same aspects of popular culture. In many ways, contemporary teachers are caught in a balancing act. They recognise the importance of valuing students’ lifeworld experiences creating learning environments where “‘popular’ knowledge is valorised and considered essential to the educational and democratic quality of the project” (Gandin & Apple, 2004, p.189). At the same time, teachers are aware of their important role in expanding students’ worldview by introducing students to new cultural forms and experiences. This again emphasises the critical role of the teacher as a designer of learning providing learning opportunities and resources, which enable students to explore and challenge their own ideas as well as those of others to transform their understandings.

Lingard’s (2007) work with the Queensland School Reform Longitudinal Study also emphasises the role of the teacher as a designer of learning. Like Darling-Hammond (2006), Lingard highlights the importance of intellectual quality in the learning design to the performance of students. In the development of the productive pedagogies model, he also noted how the pedagogies observed in classrooms were disconnected from students’ lives and communities and were often intellectually undemanding. As a result, two of the dimensions in the productive pedagogies model are ‘working with and valuing difference’ and ‘intellectual quality’. The intellectual quality dimension is based on the Newmann’s 1996 research that highlights elements of a challenging learning design:

Authentic instruction requires higher order thinking, deep knowledge, substantive conversations and connections to the world beyond the classroom. Authentic assessment involves students being expected to organize information, consider alternatives, demonstrate knowledge of disciplinary content and processes, perform elaborate communication, solve problems that are connected to the world beyond the classroom and present to an audience beyond the school (Lingard, 2007, p.254).
This particular dimension of productive pedagogies opens the door for students to bring their lifeworlds into the classroom in intellectually meaningful ways. Their differences are valued through their contributions to the learning of the group as a whole as multiple perspectives are canvassed during substantive conversations and the exploration of problematic knowledge.

An added level of learning authenticity can be created through the design of learning communities that emulate the knowledge production practices of contemporary workplaces. Sustained learning relationships are built around project teams working collaboratively to create new knowledge. Brown (2006) has described the value of working in real world contexts where learning becomes a process of enculturation:

…each community is itself embedded in a broader epistemic frame…which suggests what problems are considered interesting, what an elegant solution is like, what warrants are acceptable in an argument, and so forth. The frame is only implicit, but being in a community of practice enables the learner to intuit and embody it. Underlying this all is the notion of engaging in productive inquiry, that aspect of any activity in which we deliberately seek what we need in order to do what we want to do (p.20).

By accessing knowledge from different disciplines and using expertise from within the group and from outside organizations, students develop a sense of how knowledge is used, innovated upon and created in the completion of projects. Through this work with disciplinary specialists, students are also exposed to the culture of the discipline and their worldview. In this real world context of learning, they are building understandings of how people working in the different disciplines operate and how this disciplinary expertise can be bought together in the completion of complex projects requiring cross-disciplinary knowledge. In this type of approach, the teacher can be considered to be both a designer of learning as well as a cultural intermediary as they design learning projects that bring together disciplinary experts and students in a process of disciplinary enculturation.

In examining the changing role of the teacher in new learning, it is also important to examine the issue of student assessment in the teaching and learning process. The nature of student assessment impacts directly on levels of teacher and student agency in the teaching and
learning process, and consequently also influences the types of learning designs created and the way they are enacted in the classroom. For as Buchen (2006) argues:

What the school and community value is what they test. If what is being tested proves somewhat difficult, intractable, or ‘unamenable’ to statistical tallies, then the material has to be reconfigured to minister to the test. In short, there is often a mismatch between the statistical agenda of the school and the basic inclinations of human learning. Teaching to the test is thus often reductive and distortive (p.120).

These concerns are echoed by others including Vickers and Singh (2005), Darling-Hammond (2006), McLaren (2005) and Huber (2004). From the world of work, Woiceshyn and Falkenberg (2008) contend that the value a company places on certain attributes such as creativity, innovation, problem solving and collaboration correlates with their results in these areas. If we consider the same to hold true for educational institutions, then it is necessary to more closely align that which is valued with the goals of learning and ultimately with the assessment of those goals. The key lies in setting goals that truly reflect the values of the community and the learning institution, carefully aligning the learning designs with these goals, clearly articulating these to the learners and then ensuring that assessment tasks accurately match these stated goals.

Therefore, any meaningful assessment program must be inclusive of both teachers and students to ensure that there is a close match between teaching, learning and assessment. Such a teaching, learning and assessment process would more accurately measure the quality of teaching and the learning of students rather than measuring other arbitrary individual attributes. From this type of process, it would also be possible to evaluate the efficacy of learning designs so that informed adjustments could be made to designs where necessary. Ultimately, this recognition of the teacher’s work as a designer of learning may change the current situation in which “‘great teachers’ may be lauded for many reasons, but usually not for the quality of thinking that underlies the design and teaching of a course” (Huber, 2004, p.38). Learning designs where goals, pedagogy and assessment are closely aligned and transparent to students can be considered to better meet the needs of a diverse student population. When students fully understand the learning goals and expectations of learning activities, they have a greater sense of agency in the learning process and are better able to negotiate their individual learning journeys.
2.2.3 The New Learning Hypothesis

**New learning** is learning that responds to the demands of new social and work environments characterised by increasing levels of diversity, personal agency and knowledge complexity. Emerging from this contested ground of new learning, *Learning by Design* is a theory that re-imagines learning for 21st century knowledge societies (Kalantzis & Cope, 2005). It addresses the technological and socio-cultural changes that characterise these societies, building an approach to teaching and learning that focuses on diversity, pedagogy, multiliteracies and knowledge production. The emphasis in this approach is not on the technologies alone but rather on their potential and impact on teaching and learning. The vision is of schools as knowledge producing communities where students and teachers work together using resources from beyond the boundaries of the school and producing knowledge products to be shared publicly with a wider audience.

This theory recognises the increasingly diverse identities of learners extending beyond the gross demographic ideas of diversity including ethnicity, race, gender and socio-economic background to include subtler individual differences based on a myriad of lifeworld experiences which impact on the identities of individuals. The emphasis is on the socio-cultural differences between learners as these can be addressed in the learning context. In exploring the socio-cultural context of learning Kalantzis and Cope (2005) contend that:

> Two conditions, particularly, impact on learning: first, whether a person’s identity, subjectivity or sense of themselves has been engaged; and second, whether the engagement is such that it can broaden their horizons of knowledge and capability (p. 42).

The presence of these two key conditions of learning, belonging and transformation, creates an optimal learning environment with enhanced learning outcomes. Within this context, the teacher’s role is pivotal in the development of a learning design that incorporates these two key conditions of learning. At the same time, the learner is envisaged as an active participant in the learning process rather than as a passive recipient of knowledge. In effect, learners are considered to be active agents in the process of knowledge creation. Working with learner diversity and encouraging active participation in the learning process can be considered to be important elements in promoting learner creativity and innovation. These are considered to be highly desirable features of contemporary learning programs, preparing students for new
knowledge based workplaces that prize creativity and innovation in the development of new products for increasingly diverse markets (Warner, 2006; Woiceshyn & Falkenberg, 2008).

With the expanding array of information communication technologies readily available to ordinary citizens in their everyday lives, an added layer of diversity is introduced into the learning process, as learners are able to access these technologies to seek information and to communicate their ideas. Therefore, in line with these technological and socio-cultural changes, the Learning by Design approach is based on an expanded definition of literacy as one of multiliteracies, reflecting the contemporary communications environment, encompassing different social languages and multimodal forms of expression. In the contemporary communications environment:

The capabilities of literacy involve not only knowledge of grammatical conventions but also effective communication in diverse settings, and using tools of text design which may include word processing, desktop publishing and image manipulation (Kalantzis & Cope, 2005, p. 9).

This is an environment where students not only use knowledge but also produce knowledge drawing on a range of information sources to create new knowledge products to be shared with a range of audiences both within and outside the school context. Within this new communications environment, new possibilities for collaboration and knowledge sharing also emerge, opening up the classroom to outside experts and audiences, enabling both teachers and students to work on shared projects across different physical sites even across state and national boundaries. The Learning by Design approach was developed in such a way as to encourage this type of collaboration and knowledge sharing among teachers and students as well as potentially other interested parties.

The pivotal element in the Learning by Design theory is the pedagogical framework based on an epistemological and cultural conception of pedagogy. In Kalantzis and Cope’s (2005) terms “effective pedagogy employs ways of knowing that are capable of drawing the knower closer to the knowable” (p.71). Therefore, pedagogy is considered to be a knowledge process for knowledge is:
more than just mental processes; it is the product of our actions and our propensity as humans to mean. In this broad sense, knowledge is acting and meaning, as well as thinking (Kalantzis and Cope, 2005, p.72).

The *Learning by Design* planning framework comprises the four broad knowledge processes of experiencing, conceptualising, analysing and applying. Each of these four knowledge processes has been subdivided further refining the knowledge processes. The following extract provides a brief summary of each of these knowledge processes:

**Experiencing**

...The Known: personal knowledge, evidence from learners’ everyday lives.
...The New: immersion in new information and experiences.

**Conceptualising**

...By Naming: defining and applying concepts.
...With Theory: by putting the concepts together that make discipline knowledge.

**Analysing**

...Functionally: cause and effect, what things are for.
...Critically: people’s purposes, motives, intentions, points of view.

**Applying**

...Appropriately: ‘correct’ application of knowledge in a typical situation.
...Creatively: innovative application of knowledge, or transfer to a different situation (Kalantzis and Cope, 2005, pp.73-74).

These knowledge processes provide a basis for deliberate design decisions as teachers develop meaningful learning sequences for their students. This mindful deployment of the knowledge processes tightly links the learning activities to the intended goals of the learning and ensures that students become familiar with different ways of knowing. Through these deliberate designs, the emphasis of the learning moves beyond the content of the discipline to working on how knowledge is created in the discipline, inducting learners into that knowledge community.

The *Learning by Design* approach to teaching and learning also addresses the often thorny issue of meaningful assessment of student learning. Kalantzis and Cope (2005) argue that:
A ‘new basics’ is emerging, demanding skills and competencies which cannot be measured by testing regimes focused on the old basics. A complex, diverse society, in which knowledge has become the engine of national development and self-fulfilment, requires a much more multifaceted approach to tracking and reporting the educational achievements of individuals and educational institutions (p. 93).

Therefore, accompanying the *Learning by Design* framework is a criterion-referenced evaluation framework that allows the students’ performance to be mapped against the eight knowledge processes in the learning design. The evaluation framework contains three levels of performance: assisted competence, autonomous competence and collaborative competence. Collaborative competence is considered to be the highest level of competence requiring greater depth of understanding as well as the ability to effectively communicate these understandings to others. By assessing the students against the eight knowledge processes, there is a closer match between the teacher’s learning design and the student performance measures, making the assessment more meaningful both in evaluating the effectiveness of the learning design and in measuring the performance of individual students.

The hypothesis to be tested is that *Learning by Design*, with its emphasis on diversity, pedagogy, multilitersacies and knowledge production, addresses the needs of 21st century learners living in contemporary knowledge societies. Drawing on the literature on contemporary social spaces including schools and workplaces, it is possible to identity some common features of these new environments. These include personal connection (Kalantzis & Cope, 2005; Lingard, 2007), shared language (Brown, 2006; Gee 2006), explicitness of goals and expectations (Alvesson, 2001; Ritchhart, 2007), interactivity (Burbules, 2004; Gee, 2004, 2006), intellectual challenge (Darling-Hammond, 2006; Warner, 2006), and knowledge sharing and collaboration (Jenkins et al., 2006; Woiceshyn & Falkenberg, 2008). In considering classrooms using the *Learning by Design* framework as new social spaces engaged in new learning for new times, evidence of these features will be sought in the teachers’ learning designs and the students’ responses to these designs. Consistent with *Learning by Design*’s emphasis on diversity and consistent with Gallego, Rueda and Moll’s (2005) recommendation, the focus will be on the individual experiences of the children in engaging in learning planned using the *Learning by Design* framework. In this way, we can explore how belonging and transformation manifest themselves in these new learning spaces and how the roles of teachers and students have changed as a result of these learning designs. *Learning by Design* may indeed enable us to imagine a future with teachers and students
working together as a knowledge producing community, sharing their multimodal products with a wide and diverse audience beyond the school gate.
Chapter 3

Testing the New Learning Hypothesis

This chapter provides a rationale for the research methodology chosen, outlining the process of selecting a methodology consistent with the larger Australian Research Council (ARC) funded Learning by Design: Creating pedagogical frameworks for knowledge building in the 21st century project within which the Students Learning by Design study is located and one that is suited to working with young children in a school setting. In particular, this chapter explores the sensitivities and complexities of research with child participants, highlighting ethical considerations as well as the importance of empowering children in the research process, giving them a voice to express their perspectives on their learning experiences. The research tools are described in the light of these considerations, detailing how the data was collected, coded and analysed to test the new learning hypothesis.

3.1 Rationale

The Students Learning by Design study is firmly embedded within the broader ARC funded Learning by Design project. It is aligned with one of the key research questions from this project:

How can a pedagogical framework be designed to foster practices that are more inclusive and cognisant of the increasingly diverse needs and ways of knowing of children? (Kalantzis, Yelland, Cope et al, 2005, p.3)

The study examines learning elements designed using this pedagogical framework that incorporates a vision of schools as knowledge producing communities, multiliteracies theory, knowledge processes and diversity principles. It explores the impact of this framework on teachers’ learning designs and the subsequent learning experiences of their students. Therefore, the starting point for selecting an appropriate research methodology for the Students Learning by Design study was to closely examine the methodology of the broader Learning by Design project to develop a research design that would be consistent with this methodology. In this way, the two research activities could operate comfortably on shared
research sites and with some shared participants. This also allowed for the easy exchange of
data between the study and the project.

The broader project employs a participant co-research methodology which incorporates Yin’s
(1994) exploratory case study approach allowing the investigators to use multiple sources of
evidence in their examination of contemporary classroom contexts (The Learning by Design
Project Team, 2007). The participant co-researchers in the Learning by Design project were
teacher volunteers from the four different research sites in the Australian Capital Territory,
Victoria and Queensland. These teachers committed to collecting research data from their
classrooms for the project. Working with the research team in focus groups, they then used
the data collected in the different classroom contexts to reflect on their practices, explicitly
describing how they designed learning elements and the impact of these designs and their
pedagogical choices on their own professional practices and the learning of their students.

The use of multiple sources of authentic data from the real life context of the research site is a
strength of the case study approach. It facilitates the effective triangulation of data through a
layering of evidence to corroborate the phenomena observed as “the multiple sources of
evidence essentially provide multiple measures of the same phenomenon” (Yin, 1994, p. 92).
It allows for the building of a convincing case to support the findings of the project and
addresses the conventional arguments about the lack of rigour in qualitative research
approaches. It may be argued that the multiple pieces of evidence used in case studies to
support a phenomenon is equally or more valid than a single piece of evidence obtained
through quantitative research measures.

In contributing to one of the key research questions of the Learning by Design project, the
Students Learning by Design study remains true to the research approach of the broader
project while providing a different perspective from which to explore the question. The
Students Learning by Design study uses a case study approach to data collection using largely
qualitative approaches to data collection, allowing for the exploration of the setting as well as
the interactions within it. Therefore, the data gathered can be examined in context and the
interrelationships between different components of the data can be analysed more effectively
(Ervin 2005). The study uses multiple sources of evidence provided by the students and
teachers to explore the impact of teachers’ learning designs, pedagogical choices and
practices on student learning in different contexts. In focusing on the student component of
the project, the emphasis of the study is on developing an understanding of students’ learning
experiences by viewing them largely through their eyes. Working closely with children and teachers in the classroom to develop an understanding of their perspective posed some additional considerations in the adaptation of the research approach for the study.

3.1.1 Exploring Complex Contemporary Phenomena

To fully understand how Learning by Design addresses the challenges of preparing learners for the knowledge societies of the twenty-first century, it was necessary to explore the features of new workplaces and new learning, and how these translate into the context of contemporary classrooms. Schostak (2002) advises that in trying to understand complex contemporary phenomena our starting point should be the everyday lived experience of people, exploring how they address the challenges of contemporary life. The selection of a case study approach allowed for the detailed exploration of complex cultural spaces and phenomena in context. By examining the authentic data produced by students and teachers in the course of their everyday activities we could begin to build a picture of how Learning by Design addresses the challenges of our changing society.

The literature in the previous chapter paints a picture of a changing socio-cultural landscape with rapid advances in information and communication technologies that have impacted on the way people work, learn and play. In particular, these changes have impacted on systems of belonging and the way people construct their identities, influencing the way they relate to existing institutions. Emerging from this body of literature were some features of these new socio-cultural environments and the way people operated within them that were potentially significant for the design of new learning and impacting on the two key conditions of learning, belonging and transformation. These features included personal connection (Kalantzis & Cope, 2005; Lingard, 2007), explicitness of goals and expectations (Alvesson, 2001; Ritchhart, 2007), knowledge complexity and intellectual challenge (Darling-Hammond, 2006; Warner, 2006), interactivity (Burbules, 2004; Gee, 2004, 2006), a shared language (Brown, 2006; Gee 2006), and collaboration and knowledge sharing (Jenkins et al., 2006; Woiceshyn & Falkenberg, 2008).

These features were evident in contemporary knowledge workplaces as well as virtual social networking environments. Their potential relevance to contemporary learning environments was also evident. Therefore, these features were used as one of the analytical lenses to examine the data from contemporary classrooms using the Learning by Design framework.
Using the case study approach to research, it was possible to explore the complex cultural environment of contemporary classrooms engaged in new learning for evidence of these features and to analyse their impact on learners. To fully understand this environment, it was important to allow the participants most intimately involved in the learning process, the children and the teachers, to guide the researcher in the navigation of the terrain. As argued by Eisner (1998):

> It does not seem particularly revolutionary to say that it is important to try to understand how teachers and classrooms function before handing out recommendations for change. Yet so much of what is suggested to teachers and school administrators is said independent of context and often by those ignorant of the practices they wish to improve. If qualitative inquiry in education is about anything, it is about trying to understand what teachers and children do in the settings in which they work (p.11).

The research challenge presented by Eisner’s recommendation was to develop a research design that allowed for the exploration of this complex environment without interrupting the natural learning dynamic of the classroom. The solution was to employ, wherever possible, unobtrusive methods of data collection to maintain the authenticity of the learning environment. In effect, these unobtrusive methods of data collection were intended to minimise the ‘Hawthorne Effect’ whereby the researcher’s very presence and research activity alter the attitudes and behaviours of the students and teachers in the study, and consequently the research findings (Lee, 2000).

From a research perspective, the classroom is an artefact rich environment opening up the possibility of understanding the lifeworlds and learning experiences of students through the work that they produce both individually and in collaboration with others. Similarly, by closely examining the learning design of a learning element in conjunction with the student artefacts produced, an understanding can be built of the impact of teacher pedagogy on student learning. By working with the artefacts produced by both the teachers and the children as a normal part of their daily work, authentic data is generated, reflecting the real learning occurring in that learning space. In using these everyday artefacts and interactions of the classroom, the research can be considered to align with a post-structuralist view of research:
In the post-structuralist vision, everything in and of the world is irredeemably cultural, and therefore open to study, no matter how seemingly peripheral, insignificant or taken for granted...they focus on the cultural meaning of products, artefacts and objects...In particular, textual materials, from the very grand to the very humble products of popular culture and material culture (Lee, 2000, pp.7-8).

This allows for the exploration of complex, contemporary phenomena in context using genuine student and teacher artefacts to identify the features and impacts of new learning. This type of research is open to the unexpected as the children reveal what is important to them in the learning context, sharing artefacts from their lifeworlds and the classroom while respecting their right to work without unnecessary interruption and interference in the learning process. It values the authentic work produced by students as evidence of learning and as a reflection of their personal transformation through the learning process. In essence, to fully understand the impact of the learning designs on students it was necessary to examine the learning environment as a whole for “when much is known about a case, it is easier to see how the different parts or aspects of a case fit together” (Ragin, 1994, p.84).

3.1.2 Children’s Voices

While conscious of the need to minimise disruption to the everyday routines and work of the teachers and students, and with a firm focus on exploring authentic classroom interactions and learning experiences, there was yet another important consideration in the design of the research methodology that made a degree of interference unavoidable. This was the desire to capture the children’s voices as they chronicled their personal learning journeys. In working with children, building a picture of their experiences largely through their eyes is problematic for as Alton-Lee and Nuthall (1993) contend “The ‘official world’ of the teacher’s agenda has become not only the focus of classroom research, but also the lens through which children’s behaviour is observed and judged” (p.51).

In designing the Students Learning by Design study, there was a desire to emulate the model of the larger Learning by Design project that tapped into the tacit knowledge of the teacher co-researchers. This research model closely aligned with what Morrow and Torres (2002) described as “the ideal form of social knowledge for Freire draws on the possibilities of a subject-subject dialectic within which investigators and their subjects are involved in a communicative relationship of the type envisaged in participatory action research” (p.45). The type of process described involves mutual trust and empathy, something that is more difficult
to achieve in situations where there is a perceived difference in the level of power of the participants such as those involving adults and children. Therefore, in addition to engaging students in dialogue about their learning experiences, it was necessary to triangulate this data and to provide the students with another avenue of self-expression.

The use of a narrative approach seemed particularly appropriate to resolve this dilemma as “storytellers have agency and self-reflexivity” (Andrews, 2000, p.xii). By providing students with a written as well as an oral vehicle for self-expression, it was possible to minimise the impact of any perceived power relationship on the students. In this written form, the students were able to chronicle their personal learning journeys, choosing how they expressed themselves, what they revealed of their lifeworlds and how they understood the learning process. In this medium, the students could highlight the aspects of the learning, which most captured their imagination or impacted on their understanding, the moments of transformation when they moved beyond their existing levels of understanding. These personal reflections also revealed the student’s level of engagement and sense of belonging in the learning environment and allowed the success of the learning design to be explored in relation to how well it connected with the lifeworlds and learning needs of individual students.

It is acknowledged “research always risks subsuming the voices of people within regimes of power when they explain these voices and subject them to their a priori concepts of truth, validity and knowledge” (Zou & Trueba, 2002, p.57). However, by building in multiple opportunities for students to express their perspectives as well as by remaining open to the unexpected and using all available data sources to enrich the understanding of the context and the students’ learning experiences, it is possible to capture their truth. Further, with a case study approach using multiple data sources it is possible to give a voice to the students, enriching our understanding of the broader themes and how they play out in the experiences of individual learners.

3.1.3 Ethical Research with Children and their Teachers

Research with human participants is always fraught with ethical considerations but especially so when working with children. A great sense of responsibility is felt by all those entrusted with the care and well being of children from departmental officials to teachers, and of course, the children’s parents. Therefore, it was important to ensure that everyone fully understood the nature of the children’s participation in the study as well as that of their teachers. From a procedural perspective, this involved ethics approvals from both the
university and the ACT Department of Education and Training. In addition to these formal processes, permission was sought from the school principals at each research site, the classroom teachers and the parents of all the students in the study. The students themselves were also informed about the nature of the research and consulted at every stage of the research about the collection of data, including the copying of work samples and the recording of notes during conversations.

Importantly, ethical considerations and respect for the teachers and students in the study played a significant role in the selection of the research methodology and tools. The approach selected adheres with Lee’s (2000) ethical principles:

> It is generally considered ethically proper to respect the personal autonomy of those being studied. This implies that those participating in the research do so voluntarily and on the basis of adequate information about the proposed inquiry. It also implies that their privacy should be protected. Researchers, moreover, should do no harm to those they study. Indeed, where possible they should maximise the possible benefits from their research while minimizing possible harms (p. 57).

In the spirit of Lee’s ethical considerations, the case study approach using unobtrusive methods of data collection was designed to minimise disruption to teacher work and student learning. The teachers in the study were consulted about the design of the research tools to ensure that these could be accommodated within normal classroom learning activities and routines, providing students with opportunities for reflection and articulation of learning. The students were consulted about the items to be collected as data for the study and they were given opportunities to discuss the aspects of the learning that they considered to be significant. Through this naturalistic design of the research using authentic classroom experiences and artefacts, it was possible to ensure that all children felt included and their contributions valued in the research process even those children that were not a part of the formal research process.

Being at all times mindful of the sensitivities associated with conducting research involving child participants, measures were taken in the design of the research as well as the documentation of the research findings to protect the privacy of the participants. To protect their identities, the students were not filmed, audio recorded or photographed by the researcher. In recording the research findings, the schools, teachers and students were
allocated pseudonyms or codes to prevent the association of any of the materials, including comments and work samples, with the participants in the study. These measures were designed to fulfil the ethical requirements of the university and the ACT Department of Education and Training but also to reassure parents and teachers that all possible measures were in place to protect the children’s identities.

3.2 Research Design

To study the contemporary phenomenon of new learning in context focussing on the use of the Learning by Design framework, it was necessary to select research sites actively engaged in the larger Learning by Design project. This provided an added layer of available data as well as a ready pool of willing research participants that were committed to planning and delivering learning programs designed using the framework with its eight knowledge processes. These teachers were already committed to the design and delivery of a learning element for the Learning by Design project; therefore, the teachers’ participation in the study did not represent an additional intervention in their learning program. This made them ideally suited for participation in the study.

From the available research sites in the Learning by Design project, two schools were selected within reasonably close physical proximity that cater for the same age range of students and operate on similar philosophical principles. By choosing schools operating in the same system, it was possible to eliminate many jurisdictional differences that might impact on the data making it easier to focus on the impact of the learning designs rather than these outside factors. As the researcher was to be a regular presence in the schools over a period of two to three school terms, it was necessary to select teacher participants who were comfortable with this level of research contact. They also needed to feel comfortable with not only sharing their learning designs but also the artefacts produced as a result of these designs. For these reasons, it was important that participation was voluntary and open to other teachers in the school who were not a part of the broader Learning by Design project but were interested in the study and willing to use the Learning by Design framework. In this way, the teachers in the larger Learning by Design project did not feel compelled to participate in the study if they were not comfortable with this level of classroom research. However, the teachers in the larger project were most welcome to participate in the study, recognising that there may be some mutual benefits in their participating in both research activities, including the opportunity to consult with the researcher on the preparation of seminar presentations and on the evidence they were collecting as co-researchers in the Learning by Design project.
Once the teacher participants were selected, two from each site, it was possible to begin the process of recruiting student participants for the study from the teachers’ classes. Although, because of the age of the participants, formal written permission was sought from the parents of the students, it was still considered important for the children to be fully informed about the nature of the research study, especially since the researcher would be a presence in their classrooms for two to three school terms. Therefore, an informal presentation was held for the four classes where the researcher explained the purpose of the research and the type of data that would be collected emphasising the voluntary nature of participation in the study. The students also had an opportunity to ask questions and to make comments about the study.

It was initially expected that it would be possible to recruit approximately three participants from each class providing sufficient evidence for an in depth focus on these individual students. However, the study was open to all willing students with parental consent to ensure that children did not feel excluded if they had an interest in participating in the study. This presented a dilemma but also a potential opportunity. Although the research tools were designed to be as unobtrusive as possible and to fit into the normal learning program so that students not formally participating in the study did not feel excluded from any activities or disappointed at not being a part of the study, it still presented the potential loss of valuable information if data was not collected from all the willing participants with parental consent. Therefore, despite the potential exponential increase in data handling presented by an unexpected wealth of material, it was considered worthwhile to remain flexible during the research process and adjust the research design to accommodate any additional data when necessary. The data from a larger pool of participants would, of course, provide overall trends while it was still possible to focus in more detail on a smaller group of students as originally planned in the research design.

With the participants in place, it was then necessary to negotiate the organisational aspects of the research design. Mindful of the complexities of school organisation and multiple commitments on teacher and student time, the research design needed to be flexible to fit in with these considerations as well as with the natural flow of the students’ learning program. Therefore, the beginning and end points of the research study varied from site to site. Data collection schedules and visits were organised on an individual basis with each teacher based around the students’ learning program and other commitments. These schedules were flexible to allow for visits to occur when teachers and students noticed something interesting and
invited the researcher to witness a particularly exciting lesson, to hear about a recent learning experience or to see newly completed work. Similarly, the flexible nature of the research design as well as the physical proximity of the schools allowed for unexpected changes to scheduled times for visits. This type of flexibility makes it easier to work within the school environment, allowing for the unexpected changes that can occur during the school day.

### 3.3 Collecting the Evidence

In response to Eisner’s (1998) contention that qualitative research in schools should first and foremost explore the work of teachers and students in their environment, the classroom, the research focuses on two key data sources, the teachers and the students. The research also reflects Lee’s (2000) recommendations on ethical research practices and the viewing of everyday classroom products as valuable cultural artefacts that allow for unobtrusive data collection that minimises interference with normal classroom routines and practices. Therefore, the evidence collected was, wherever possible, the natural product of the everyday work of the students and their teachers.

#### 3.3.1 Learning Designs

For Burbules (2004), as people transform spaces through their collective or individual endeavours they become places. In his terms “a place is a socially or subjectively meaningful space” (Burbules, 2004, p.174). The learning elements produced by teachers represent a deliberate plan for transforming the classroom into a meaningful place for learning. The learning element can be considered to be a map charting this process:

… that makes manifest our involvement with a space, the places we care about; it is an expression of interest, as mapping is a kind of problem solving (how do we find our way about); it entails an act of imagination, because mapping is a process of selecting what is judged to be significant enough to include, and of adding a structure of association and organization for what is selected (in other words, it is both less and more than the original); and finally, mapping is a process of interaction, changing what is mapped from space to place, in the process of trying to describe it (Burbules, 2004, pp. 175-176).

In effect, learning elements describe the learning journey ahead for the students. They are the product of a multitude of complex, thoughtful and deliberate design choices about curriculum content and pedagogy based on the teachers’ experience and expertise, knowledge of their
students and guided by the learning goals set out in departmental documentation. The learning elements bring together these multiple and at times, overlapping influences into a cohesive and coherent learning design. This professional design process involves imagination, creativity and problem solving as the teachers map out a meaningful sequence of learning activities, engaging students in learning that transforms their understandings. In learning elements designed using the *Learning by Design* framework these activities are recorded under eight knowledge processes – Experiencing: The Known, Experiencing: The New, Conceptualising: By Naming, Conceptualising: With Theory, Analysing: Functionally, Analysing: Critically, Applying: Appropriately, and Applying: Creatively (Kalantzis & Cope, 2005). This involves teachers explicitly determining the thinking processes to be deployed during the learning activities.

These detailed planning documents are a rich source of information on the curriculum content and pedagogy to be found in the teachers’ classrooms. By examining the learning element, we can determine how the teachers address the two key conditions of learning – belonging and transformation through the learning designs. They also provide a useful frame of reference for examining student artefacts such as work samples, journal entries and learning conversations to develop a picture of the learning journey from design to delivery. Through the learning elements, we are able to explore how the teachers’ complete learning designs. They reveal the teachers’ pedagogical choices, use of learning spaces and the planned social interactions, including the social conventions governing the creation and sharing of knowledge in the learning space, that impact on the learning of students with diverse learning preferences and interests.

An initial scan of the learning elements focusing on the lens of the eight knowledge processes from the *Learning by Design* framework was used to provide a snapshot of the balance of processes within the learning elements, revealing the teachers’ pedagogical choices and highlighting any differences between the learning designs. This involved tabulating the number of activities under each of the knowledge processes against the number of overall activities in the learning element. The percentages were rounded to the nearest whole number. In the research design there was a deliberate emphasis on the number of opportunities to engage in a given knowledge process as opposed to the amount of time spent on each knowledge process as it is considered that the time spent on an activity is not necessarily an indicator of quality or the importance of an activity to the overall learning design.
Table 3.1 Grid for tabulation of knowledge processes in learning elements

<table>
<thead>
<tr>
<th>Learning Element</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Known</td>
<td>The New</td>
<td>By Naming</td>
<td>By Theorising</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After the initial scan of the data, drilling further into the learning elements, each learning element was coded for evidence of the six features of new social spaces, including workplaces, identified through the literature review. These features are: personal connections to the project (Kalantzis & Cope, 2005; Lingard, 2007); explicitness with a clear articulation of goals and expectations (Alvesson, 2001; Ritchhart, 2007); knowledge complexity and intellectual challenge (Darling-Hammond, 2006; Warner, 2006); interactivity (Burbules, 2004; Gee, 2004, 2006); shared subject specific language (Brown, 2006; Gee 2006); and collaboration and knowledge sharing (Jenkins et al., 2006; Woiceshyn & Falkenberg, 2008).

The scan of the learning elements explored whether these features of new social spaces were also present in the learning designs for classes engaged in new learning using the Learning by Design framework. Evidence of these features was again tabulated against the number of overall learning activities within the learning element to produce a percentage, facilitating the comparing and contrasting of data from each of the learning elements.

Table 3.2 Grid for tabulation of features of new social spaces in learning elements

<table>
<thead>
<tr>
<th>Learning Element</th>
<th>Personal Connection</th>
<th>Explicitness</th>
<th>Intellectual Challenge</th>
<th>Interactivity</th>
<th>Shared Language</th>
<th>Knowledge Sharing &amp; Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With the complexity of some learning activities, it was possible to find multiple pieces of evidence for the one feature within an activity; however, these were not recorded separately.
as the aim was to develop an overall picture of the prevalence of these features across the learning element.

Once evidence of these features was identified in the learning elements, this data was correlated with the knowledge processes to show the distribution of these features across the eight knowledge processes. These distribution patterns were used to analyse the interrelationships between the features and the knowledge processes, indicating how the knowledge processes influence the presence of these features in classrooms engaged in Learning by Design. Again, the data was tabulated separately for each learning element.

Table 3.3 Cross tabulation grid of features and knowledge processes

<table>
<thead>
<tr>
<th>Features</th>
<th>Learning Element</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Known</td>
<td>New</td>
<td>Naming</td>
<td>Theory</td>
<td>Functionally</td>
</tr>
<tr>
<td>Personal Connection</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicitness</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual challenge</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactivity</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Language</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge sharing &amp; collaboration</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Through this detailed examination of the three learning elements a picture began to emerge of the similarities and differences between the three learning designs and the impact of the Learning by Design framework on these designs. When combined with the student response and performance data, it was possible to assess the effect of these designs, developed using the Learning by Design framework, on students’ learning experiences and performance.
3.3.2 Learning Journals and Conversations

Personal learning journeys chronicled through tales told and experiences recounted in learning journals provide a rich source of student data. These oral and written personal narratives reflect the students’ experiences of the learning elements. In Andrews’ (2000) terms “their stories are temporal constructions which create the realities they describe” (p.xii). In these personal narratives, the students actively made choices foregrounding the aspects of their lifeworlds that are important to them and significant in engaging them with the learning experiences designed by the teacher. In this way, the researcher gained insights into the world of the learner to understand the impact of the learning design on the learner and the impact of the learner on the learning design. For in order to effectively evaluate the learning design, we need to understand the learners engaging with the design.

Conversations about learning provide a starting point for exploring student subjectivities. They enable us to begin to create a rich image of the learner as a person and to identify the influences that inform the way they interact in and interpret the learning process. The data collected provides information on the multiple fluid identities of learners that are developed through their life experiences and impacted on by the media and popular culture. Unlike in more formal interviews, within this conversational context the students are empowered to choose the elements of their identities that they wish to share with others. These conversations help to create a picture of the diversity within the research context as well as providing insights into the lifeworlds of individual students within the research setting.

We live in stories, and do things because of the characters we become in our tales of self. This narrated self which is who I am, is a map. It gives me something to hang on to, a way to get from point A to point B in my daily life (Andrews et al, 2000, p.xiii).

Within the research context of this study, this map was a valuable tool for analysing the effectiveness of the learning design for individual learners. An understanding of the learner’s lifeworld made it possible to evaluate the effectiveness of the learning design in engaging the subjectivities of the individual learner – to understand how the learner belonged in the learning and the learning environment created by the teacher.

To create the conditions for an open dialogue with students no formal interview schedule was used rather students were encouraged to tell the researcher about their learning experiences
using their own work samples as prompts. In many ways, these learning conversations resembled the children’s learning journeys with their parents. On these occasions, the children showcase their work and explain their learning experiences to their parents and other significant adults such as grandparents. For many of the participants in the research, this has been a feature of their schooling since kindergarten. The students were asked for their permission for notes to be taken during the discussion and these were corroborated with the students during the conversation to ensure that they represented an accurate record of their statements. This immediacy is particularly important in working with children, as later recall of their statements may prove difficult. To maintain the informality of these discussions, they were conducted in the children’s normal learning spaces with others milling around and at times, contributing comments to the discussion.

To support the discussion, to clarify points made by the students or to pursue a line of inquiry prompted by the students’ comments some questions were posed during the discussion. A list of questions was also prepared as possible conversation starters; however, this was in no way a prescriptive or exhaustive list:

- What are your favourite activities? Why?
- What makes a good activity?
- What activities don’t you like? Why?
- Is this activity easy or difficult? Why?
- Do you prefer easy or hard activities? Why?
- How did you decide what to do?
- Did anyone help you with this activity?
- What did you learn from this activity?
- Is there anything that you would do differently? Why?
- What things help you to learn?
- What sorts of things do you like to learn about?
- Where do you like to work? Why?
- Do you like working by yourself or with others? Why?
- Who helps you to learn? How do they help you?

It was anticipated that further questions would emerge as a result of discussions with the students, enabling interesting lines of inquiry initiated by the students to be pursued further with other students in the research study.
Learning journals provided the students with another avenue of expression about their learning experiences. They gave students an opportunity to personally reflect on their learning to consider their own learning journey. As they reflected, they developed insights into how they learn, the ways in which their understandings are transformed and how the learning connects to their lifeworlds. Through the learning journals students were engaged in evaluating their own learning as well as their learning experiences. This type of research tool is ideal for the school context as it is a learning activity commonly used by teachers making it easy to weave into the learning program. As a data source, learning journals provide valuable data on the students’ personal learning journeys, highlighting their role in the learning process, and describing their level of engagement with the learning and the ways in which their subjectivities are linked to the learning.

To fully integrate the learning journal into their normal classroom routines and to ensure that students not participating in the study did not feel excluded, all students were presented with a journal to record their thoughts. Again, as with the learning conversations, a deliberate attempt was made to empower the students by giving them ownership of the journal with the students governing the style of the learning journals as “no form of knowledge can be separated from language, discourses and texts at work within culture”(Usher et al, 1997, p.31). However, aware of the need to scaffold children’s learning experiences some possible sentence starters were provided to the teachers to use at their discretion if children experienced difficulty in deciding what to write about in their journals. The following are examples of some possible sentence starters:

- I liked this activity because...
- ...helped me with my work and we...
- This activity was interesting because...
- I found this hard because...
- This was easy because...
- Today I learnt...
- Before I didn’t know that...
- I would like to learn more about...
- We worked well together because...
- The way I completed this activity was ...

Ultimately, the classroom teachers were able to modify the journal activity to best suit their students. This was particularly important for the youngest students in the research study as
they were just learning to write. Therefore, for these students the learning journal could be modified with sentence starters already printed to support their early writing efforts and the students then completing the statement using words and illustrations.

Consistent with the data from the learning elements, the data from the students’ learning journal entries (J) and learning conversations (C) were assessed for the features of new social spaces identified through the literature review. Therefore, the students’ journal entries and learning conversations were coded for evidence of personal connection to the learning, including affective responses to the learning and links to students’ lifeworlds; explicitness demonstrated through the students’ understanding of the goals and expectations of learning activities; intellectual challenge evident in references to the knowledge complexity and intensity of learning activities; interactivity reflected through the students’ active participation in the learning; shared language revealed through the students’ use of subject specific language; and collaboration and knowledge sharing based on students’ references to these types of learning activities. The results from each of the data sources, learning journals and conversations, were tabulated separately and then a combined total for the two sources of data was calculated for each student. From the tables for each research cohort, it was then possible to identify the low and high score as well as the median score for each feature for the three research cohorts. This facilitated the comparing and contrasting of data from the three research cohorts.

Table 3.4 Tabulation grid of features in student learning journals and conversations

<table>
<thead>
<tr>
<th>Student</th>
<th>Personal Connection</th>
<th>Explicitness</th>
<th>Intellectual Challenge</th>
<th>Interactivity</th>
<th>Shared Language</th>
<th>Knowledge Sharing and Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By examining both the teacher designed learning elements as well as the student generated learning journal entries and conversations through the same lens, the features of new social spaces, a more detailed picture of the complete learning journey was built. Through this process, the impact of the learning design on the students’ learning experiences was assessed.
by determining whether there were any correlations between evidence of the presence of these features in the designs and in the students’ learning journals and conversations. While the analysis of student response data using the lens of the features of new social spaces enabled patterns to be identified in the data, the learning journals and conversations were also a window into the children’s thoughts and feelings about their learning experiences, allowing them to more fully explain the impact of the learning element on their learning. They were a source of rich qualitative data that enabled individual cases to be explored in more detail to deepen our understanding of personal learning journeys and to assess how the learning designs engaged diverse learners in the learning process. Therefore, extracts from the students’ learning journals and conversations were used to illustrate and explain the patterns identified in the data.

3.3.3 Processes, Products and Performance

To fully appreciate and understand the impact of new learning on students, we need new forms of assessment which value the products produced through new learning designs and focus on the learning process as well as the end product. Kalantzis and Cope (2005) argue:

Traditionally, assessment in schools has focussed on examinations and tests. However this approach to measuring learning is not adequate for the purposes of New Learning, where education is less about individuals accumulating a library of facts and regurgitating received theories and is more about shaping the kind of person who will need to be knowledgeable in a much broader and deeper sense (p. 89).

To address this problem, they designed the Learning by Design Criteria for Measuring Learning (Kalantzis & Cope, 2005). These criteria link directly to the teacher designed learning elements, aligning student performance measures with the eight knowledge processes in the Learning by Design planning framework. In this way, assessment is linked to learning goals with teachers using their professional expertise to evaluate the students’ performance based on the products and processes that form an integral part of the learning process. By closely linking teaching, learning and assessment the assessment rubrics provide valuable information on student performance and the effectiveness of the learning designs for individual learners. The Learning by Design Criteria for Measuring Learning empowers both teachers and students in the assessment process, providing teachers with a tool to evaluate not only the performance of their students but also the effectiveness of their learning designs while students are given an explicit understanding of the criteria to be used to evaluate their
performance. In the *Learning by Design Criteria for Measuring Learning* collaborative competence is considered to be the most sophisticated level of performance reflecting the higher level of understanding and communicative competence necessary for effective collaboration.

Table 3.5 Learning by Design Criteria for Measuring Learning

<table>
<thead>
<tr>
<th>PERFORMANCE LEVELS</th>
<th>KNOWLEDGE PROCESSES</th>
<th>LEVEL 1: Assisted Competence: Needs explicit instruction or support from the teacher or peers to be able to undertake the task or activity.</th>
<th>LEVEL 2: Autonomous Competence: Can figure out how to undertake the task or activity by themselves, and complete it successfully (their own work, or a part of a joint piece of work).</th>
<th>LEVEL 3: Collaborative Competence: Can work effectively with others, including people with less or different knowledge and expertise than themselves, to produce an excellent piece of work (their own, or a joint piece of work).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceiving:</strong></td>
<td></td>
<td>Needs prompts from the teacher or peers to make the connection between their own everyday life experience and the learning task.</td>
<td>Can figure out for themselves the connection between their own everyday life experience and the learning task.</td>
<td>Is able to demonstrate to others the connections between the learning task at hand, and their own or the other person’s everyday life experience.</td>
</tr>
<tr>
<td><strong>The Known</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>The New</strong></td>
<td></td>
<td>Needs scaffolds by the teacher or peers to make sense of an unfamiliar text, place, activity or group of people.</td>
<td>Is able to make enough sense on their own of an unfamiliar text, place, activity or group setting to be able to understand its general gist.</td>
<td>Is able to engage in and with an unfamiliar text, place, activity or group in such a way that they actively interact with it or add meaning based on their own perspective, knowledge and experience.</td>
</tr>
<tr>
<td><strong>Conceptualising:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>By Naming</strong></td>
<td></td>
<td>Once explained to them, is able to use a concept in appropriately in context, and generalise effectively using this concept.</td>
<td>Is able to work out for themselves the meaning of a concept from the context of its use or by looking up its meaning, and then use that concept to make an abstraction.</td>
<td>Is able to define a concept in terms of other concepts, and explain that concept to other people with an accurate, simplifying definition and by providing clear examples.</td>
</tr>
<tr>
<td><strong>By Theorising</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analysing:</strong></td>
<td></td>
<td>Is able to see the connection between two or more concepts once this is pointed out to them.</td>
<td>Is able to work out for themselves the connections between concepts in a theory.</td>
<td>Is able to put concepts together in a theory and explain that theory to another person.</td>
</tr>
</tbody>
</table>

71
<table>
<thead>
<tr>
<th>Functionally</th>
<th>Analysing: Critically</th>
<th>Applying: Appropriately</th>
<th>Applying: Creatively</th>
</tr>
</thead>
<tbody>
<tr>
<td>pointed out to them, the general function or purpose of a piece of knowledge, text or human activity, or causal connections.</td>
<td>Is able to comprehend, once explained to them, some of the obvious human interests and agendas behind a text, action or piece of knowledge.</td>
<td>Is able, in a supportive and structured environment, to communicate or act in ways which conform to conventions or textual genres.</td>
<td>Is able, in a supportive and structured environment, to put together in a meaningful way, two or more conventional forms of communication or action.</td>
</tr>
<tr>
<td>connections for themselves.</td>
<td>Can construct a plausible interpretation of the underlying motives, agendas and interests driving a text, action or piece of knowledge.</td>
<td>Is able independently and without explicit scaffolds or instructions, to communicate or act in ways which conform to conventions or textual genres.</td>
<td>Is able independently and without explicit scaffolds or instructions, to put together in a meaningful way, two or more conventional forms of communication or action.</td>
</tr>
<tr>
<td>figure out and demonstrate the way they see causal connections to people who may not see them the same way.</td>
<td>Can corroborate from multiple sources an analysis or develop a group understanding of, the explicit and implicit motives, agendas and actions.</td>
<td>Masters a convention or a genre to the point where they become fully-fledged members of a new community of practice.</td>
<td>Can create a hybrid text, action or group environment which involves a genuinely original combination of knowledge, actions and ways of communicating.</td>
</tr>
</tbody>
</table>

From *Learning by Design Guide* (Kalantzis & Cope, 2006, p.100)

Within the research context of this study, this valuable data from the assessment criteria rubrics was used to provide both baseline and endpoint performance measures on the students in the senior research cohorts in the study. The baseline data measured the students’ performance at the beginning of the learning element (A) while the endpoint assessment measured the students’ performance at the conclusion of the learning element (B). In both assessments the students’ performance was measured against the eight knowledge processes with teachers recording whether the students were performing at an assisted competence (1), autonomous competence (2) or collaborative competence (3) level. These results were then tabulated separately for the two senior research cohorts, recording each student’s performance at the beginning and again at the end of the learning element as well as their overall shift in performance across the eight knowledge processes. The overall shift per knowledge process was also recorded for each senior research cohort.
Table 3.6 Grid for tabulating student performance data

<table>
<thead>
<tr>
<th>Student</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
<th>Shift per student</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New</td>
<td>Known</td>
<td>Naming</td>
<td>Theory</td>
<td>Functionally</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shift per process 105

In conjunction with the student response data, the data from the assessment criteria rubrics provided evidence of student transformation. These performance measures added to our understanding of the impact of the learning elements on the students focusing on the learning outcomes achieved through the designs. By assessing the students against the knowledge processes, it was possible to link their performance directly with the learning elements that were designed using the same eight knowledge processes, thus, it was also possible to assess the efficacy of the learning designs.

An alternate performance measure was used with the learners’ in their first year of formal schooling. For these young students, the classroom teacher provided information from her literacy assessment at the beginning of the year and again at the end of the year as well as other evidence of student transformation she collected as a part of her commitment to the wider Learning by Design project. This data from the larger Learning by Design project was used to assess the impact of learning elements designed using the Learning by Design framework on younger students. When combined with student work samples, the literacy data contributed to building a picture of student transformation in an early childhood classroom engaged in Learning by Design.

Using largely unobtrusive and readily available data sources, including artefacts produced by both the teachers and students as a part of their everyday teaching and learning activities such as the teacher designed learning elements, students’ learning journals and conversations, and performance measures a picture emerged of the entire learning journey for the students in the study. Through a triple lens analysis of this data that combined the knowledge processes, the
features of new social spaces and student performance measures it was possible to assess the impact of learning designs created using the *Learning by Design* framework on students and to evaluate the efficacy of the designs in addressing the needs of individual learners with diverse lifeworld experiences. At the same time, the promise of new learning for new times was critically examined, exploring how learning in classrooms using *Learning by Design* reflects the socio-cultural changes in the wider society, including contemporary workplaces.
Chapter 4

Setting the Scene – People and Places

This chapter sets the scene for the research study providing background information on the educational jurisdiction in which the study takes place. It describes the schools from which the research sites were selected and introduces the teachers participating in the study. A brief description of the three teacher designed learning elements is included outlining the focus of the learning and the learning areas targeted. The chapter also introduces the students who acted as key informants in the study sharing their learning journeys, their personal perspectives on their formal learning experiences and their views on the significance of these experiences to their lifeworlds.

4.1 Spaces and Places

The research sites in this study are all within the jurisdiction of the ACT Department of Education and Training. Within the Australian context, it is a relatively small but diverse system with schools operating with a degree of autonomy. Schools are responsible for their financial management and curriculum development within the broad administrative guidelines provided by the department including the Every Chance to Learn Curriculum Framework for ACT Schools (P-10). However, the department closely monitors the performance of schools within the system and holds them accountable for the achievement of students.

Reflecting the general decline in reading literacy across Australia in the PISA testing from 2000 to 2006, reading literacy results for ACT students also declined (Thomson & de Bortoli, 2008, p.2). However, ACT students still outperformed their counterparts in other states recording higher average achievement scores in literacy. The ACT differs from other Australian jurisdictions in that the measure of socio-economic difference is narrower than in other states with lower and higher socio-economic levels also above those of other states. Interestingly, across all socio-economic levels and in each literacy domain tested, the performance of ACT students was higher than that of other Australian jurisdictions. Thomson and de Bortoli (2008) concluded that:
The average socio-economic background for the Australian Capital Territory is generally higher than that of other states. Performance is also generally higher than that of students in other states (p. 29).

Within this context when exploring student performance, a broader definition of diversity is particularly useful that captures not only gross demographic differences but also underlying lifeworld differences such as experiences, interests, dispositions and interpersonal styles as defined by Kalantzis and Cope (2005).

The two ACT research sites are part of a close knit cluster of schools that work together in developing strategic directions, and implementing new teaching and learning initiatives. As a part of their drive to improve literacy outcomes, the cluster schools, including several primary schools and a high school, pooled their financial resources to employ a cluster deputy principal as a pedagogical mentor with the shared belief from Kalantzis and Cope that:

The old basics of the three Rs must be re-conceptualised in order to reflect contemporary changes to learning. Schools must develop each student as a learner, as a person, as a community member and as a contributor to society. These students will command more than a body of knowledge. They will be able to navigate change, embrace diversity, learn as they go, solve problems, collaborate and be flexible and creative (Cluster Information Pamphlet, 2007).

The pedagogical mentor gradually introduced teachers in the cluster schools to the *Learning by Design* framework and facilitated the development of a cluster learning and teaching model from kindergarten to year 10. The *Learning by Design* framework is defined as a key element of this model providing a “planning tool to achieve good teaching and learning” (ACT Department of Education, Youth and Family Services website, 2008). Units of work in the cluster are documented using the *Learning by Design* framework and incorporate the ACT Department of Education developed Essential Learning Achievements from the *Every Chance to Learn* curriculum framework.

After two years and with financial support from the department, the cluster was able to formalise their work with *Learning by Design* by participating in the Australian Research Council funded research project. At least two teachers from each school were selected to participate in the *Learning by Design* project, creating a supportive partnership for work on
research tasks. The teachers in the Students Learning by Design study were drawn from the pool of teachers participating in the larger research project. Two research sites were selected along with the teacher researchers from the project and their classes to participate in the study. The following provides a more detailed description of the two research settings and the learning journeys of the teacher researchers in the study.

4.1.1 Proficient Primary School

Proficient Primary School like many ACT primary schools is built on an open plan design and is surrounded by playgrounds and ovals. Individual buildings typically house four classes of approximately the same grade level. The buildings include a shared space for communal activities as well as a wet area for art, craft and science activities. Students have access to computers and interactive whiteboards within their building as well as within the school’s library. The school population is largely drawn from the surrounding suburb although out of area students are also enrolled in the school. As with most ACT government schools, the student population is socio-economically and culturally diverse, reflecting the mix of public and private housing in ACT suburbs where up to the mid 1990s there were only three suburbs without public housing in the entire territory. Within the broader region incorporating Proficient Primary School, the level of public housing is eighteen percent of total public housing stock (Department of Disability, Housing and Community Services website, 2008). The school also caters for special needs students within mainstream classrooms.

The two teachers from Proficient Primary School participating in the Learning by Design research project were both experienced teachers having each worked for over twenty years in schools in the ACT as well as other jurisdictions. They both commenced working with the Learning by Design framework two years prior to the formal research project as part of an informal trial of the framework in the cluster. As a result, the use of Learning by Design was firmly embedded in their practices. They had both taken a lead role in supporting others with documenting using the Learning by Design framework. In their use of the framework, they felt confident to develop innovations to further support their work, including big book formats to make the learning element accessible to students and devising quick reference summaries for teaching colleagues. During the initial trial both teachers worked closely together as a teaching team; however, over time their expertise was deployed to different teaching teams in the school. Consequently, during the research project the teachers worked in different areas of the school whilst still supporting each other with their research project commitments.
During the *Students Learning by Design* study, Ms Sure worked with students aged ten and eleven in the senior school while Ms Able worked with five and six year olds in the junior school. Both teachers worked as a part of a four teacher teaching team, working particularly closely with their neighbouring teaching partner. During this time, Ms Sure acted as a mentor for her teaching partner who was a beginning teacher undertaking the department’s probationary process for new teachers to the system. Consequently, the two classes often worked together participating in many joint activities. As a part of the schools teacher release program, a support teacher also worked with the senior classes, providing specialist science lessons to complement the classroom program.

Ms Able’s team also included two teachers who were relatively inexperienced users of the *Learning by Design* framework. Therefore, initially she used her experience to support the team in the planning of the learning element using the *Learning by Design* framework and introduced them to some of the innovations that she had developed such as the quick reference summary of the learning element and the big book format for sharing with the children. Particularly, in the early stages of using the planning framework, this ready access to an on-site mentor with an understanding of the knowledge processes was invaluable as a source of timely advice.

### 4.1.2 Novice Primary School

Novice Primary School like the other primary schools in the cluster is constructed on an open plan design with separate buildings housing four classes of approximately the same grade level. Each building has space for joint activities and a wet area for art, craft and science activities. Students have access to computer facilities in the school’s library and resource centre. The school is located adjacent to open space and playing fields for outdoor activities. Since opening, the school has largely drawn its student population from the growing surrounding suburbs. Reflecting the population of the suburbs, the student population is socio-economically and culturally diverse. The school caters for special needs students in mainstream classes as well as through specialist programs. In catering for its diverse student population, the school aims to “promote responsibility, knowledge of self and tolerance of others within a caring environment” (ACT Department of Education, Youth and Family Services website, 2008).

In contrast to Proficient Primary School with an established staff of experienced teachers, Novice Primary School with its growing student population attracted a significant number of
early career teachers. It also experienced considerable staff turnover as a result of the department’s beginning teacher mobility program. During this time, the school pursued different priorities and as a consequence the teachers did not participate fully in the cluster’s early work with *Learning by Design*. However, with the commencement of the *Learning by Design* project the school began working closely with the cluster pedagogical mentor to implement the cluster teaching and learning model, and to use the *Learning by Design* framework as a planning tool.

Ms Young, an early career teacher with four years experience, began working with *Learning by Design* at the commencement of the formal research project while Ms Newton joined the research project in its second year of operation. Ms Young still considered herself to be a learner developing her understandings and use of the *Learning by Design* framework. For Ms Newton it was a steep learning curve, embarking on a project in its second year of operation among a group of experienced colleagues from the cluster, some of whom had been working with the framework for four years. In addition to learning about the framework, she was also honing her skills as a teacher researcher as a part of the larger *Learning by Design* project. However, much to the delight of Ms Young, Ms Newton brought with her six years of teaching experience, providing Ms Young with what was a rare opportunity at Novice Primary School of working with a more experienced teacher. This partnership of two dedicated young teachers developed into a close working relationship with the two senior classes working together on the learning element and with the teacher researchers confidently presenting their work at the Elearning Symposium at the end of the year.

### 4.2 The Designs

A learning design is a purposeful plan of action describing the teachers’ intended strategies for achieving the desired outcomes. In a sense, it is also a map plotting the likely route of the learning journey, indicating what the teachers considered to be a logical sequence of activities. Learning elements designed using the *Learning by Design* framework also make explicit the thinking processes to be deployed during the different learning activities, thereby, providing additional information on the intent behind the activity. By exploring the features of the individual learning designs and correlating these with the students’ responses to the enacted plans, it is possible to develop a more complete picture of the learning journey for both the teachers and the students.
4.2.1 Proficient Primary School’s Learning Elements

Within the primary schools in the cluster, the planning of integrated units of work is an established practice. The learning element planned for the senior school students was a complex one that integrated Studies of Society and Environment, values (responsibility), literacy and science. The scope of the learning was “the importance of water and the impacts of human use on the environment, catchment areas and the water system, and accountability for their own actions, in relation to the environment and in cooperative groups” (Learning element A, 2007, p.6). The learning element was designed to give students opportunities to work with different teachers and students in the learning space, and to incorporate the learning from the specialist science program. The learning element incorporated knowledge objectives under the four broad knowledge processes of Experiencing, Conceptualising, Analysing and Applying including the following:

**Experiential objectives**
… exploring the water cycle and the way we effect our catchments through experiments.

**Conceptual objectives**
… identifying and collecting data relating to environmental impacts
… hypothesising about the distribution of the world’s water; defining a catchment

**Analytical objectives**
… comparing and contrasting uses for water
… interpreting data to support or refute a particular prediction

**Applied objectives**
… developing a catchment management plan relating to a local issue (Learning element A, 2007, pp.7-8).

The learning element was also designed to complement a web-based resource that engaged students nation-wide in a competition to solve a scientific mystery. The literacy component of the learning element focussed on the use and production of information texts.

The learning element included a strong values component consistent with the national values education framework. A recurring activity within the learning element was a personal reflection recorded in a Values Journal. The following is an example of an activity from the
learning element incorporating the Values Journal as well as connections to personal actions and the home, entitled *Round and Round – What can I do?*

Using the Kidspiration program on the computer, create a concept map answering the question: ‘How can I be more responsible with water use?’

In your Values Journal write a reflection about how you will be more responsible with water.

Homework task – identify a goal to improve your water usage habits at home. Write a personal response to your actions (Learning element A, 2007, p.12).

The learning element also focussed on the development of personal responsibility for work behaviours. This included the collaborative creation of a set of expectations for effective and appropriate work behaviours. The students designed rubrics in response to the focus question: “What qualities are important to investigating responsibly?” (Learning element A, 2007, p.21). These rubrics were then used as a guide when students evaluated their group’s performance in their reflective journals.

The learning element for the junior school was also an integrated unit of work focussing on social skills and literacy. The learning element was designed specifically to address important issues for young children at the beginning of the school year, emphasising friendships and “getting along with others – learning to listen, speak and act in respectful ways” (Learning element C, 2007, p.6). This ties closely with the school’s stated aim “to promote knowledge of self, understanding and respect for others, social responsibility and harmonious peer relationships within a caring, supportive and safe environment” (ACT Department of Education, Youth and Family Services website, 2008). The learning element incorporated the following knowledge objectives:

*Experiential objectives*
Explore what a friend looks like and sounds like

*Conceptual objectives*
Understand the concepts of sharing, caring, including and consideration

*Analytical objectives*
Analyse the importance of caring, consideration and inclusivity play in friendship

*Applied objectives*
Acts with integrity and regard for others by making considered decisions… (Learning element C, 2007, pp.7-8).

Narrative texts were chosen as a vehicle to explore friendships and children were encouraged to produce oral, pictorial, gestural and written responses to issues under examination. The learning activities were closely linked to the children’s personal experiences both at home and at school with the aim of building the children’s skills and confidence in establishing and maintaining positive relationships with others as well as enhancing their ability to work effectively with others.

The teachers designed activities linking the learning to the children’s lifeworlds. These included activities, which drew heavily on students’ experiences, involved personal reflection or required them to project themselves into hypothetical situations as well as activities requiring them to interview others, including family members. One such activity was based on the book “Bush Games and Knucklebones” by Doris Kartinyeri:

Discuss the facial expressions. How do the children in the story create their own fun from the environment? List the various ways of having fun. Home task – interview parents/grandparents about fun games they played when they were children. Add to the list above. Outdoor games afternoon – invite parents and grandparents to share fun games from their childhood. Also conduct games from the book “Bush Games and Knucklebones.” Games might include skipping, elastics, building a bus, marbles, making a secret garden with footprint trails etc (Learning element C, 2007, p. 23).

The learning element was detailed and contained specific instructions for children to follow as well as providing focus questions to direct the children’s attention to the intended goals of the learning activity.

4.2.2 Novice Primary School’s Learning Element

Using the Learning by Design framework, Ms Young and Ms Newton worked collaboratively to design and deliver an integrated unit of work on fairytales incorporating literacy, and the performing and creative arts. The scope of the learning included the reading and writing of narrative texts focussing on their grammatical and structural features as well as the creative presentation of ideas using communication technologies, drama and the visual arts. Ms Young and Ms Newton selected this focus because although their students were familiar with
narrative texts and their grammatical and structural features, they “have difficulty applying them and identifying them” (Learning element B, 2007, p.5). The following formed a part of the knowledge objectives of the learning element:

**Experiential objectives**
Participate in a rotational story telling activity

**Conceptual objectives**
Identify language features of narratives

**Analytical objectives**
… examine how characters, people and events are represented in different texts and offer alternatives

**Applied objectives**
Use different materials, skills and processes to make 2D and 3D artistic works
(Learning element B, 2007, pp.6-7).

The learning element provided opportunities for the students to compare and contrast different written versions of fairytales as well as film versions of the stories. This included lessons on the language structure of narratives as well as grammatical features of texts such as the use of tense and conjunctions. For example, the students recreated narratives from fractured texts with labels provided to illustrate features such as orientation, complication and resolution. Comparisons were drawn between written narrative texts and film narratives with students required to:

Compare and contrast notes from “Ever After” and “Cinderella Story” and create the director’s rationale (reason for creation, implications for society, needs of audience) (Learning element B, 2007, p. 15).

This activity formed part of the lead up activities to the students’ creation of their own fairytales for presentation at the rotational ‘Fairy Tale Day’ for their junior buddy class. For this day, the students worked collaboratively to produce their own fairytales in a mode of their choice. This included plays, pre-recorded video clips and audio books for the younger students.
4.3 Knowledgeable Learners

In line with the research design, the richest source of data for the *Students Learning by Design* study was supplied by the children in the classes of the teachers participating in the research project. These were the knowledgeable learners who were eager to share their learning experiences with others. The open request for research participants was met with an overwhelmingly positive response from the students and their parents. All the students in the three research cohorts provided valuable information to the research study contributing to our understanding of the impact of *Learning by Design* on student learning. Unfortunately, within the scope of this study, it was not possible to fully explore each child’s personal learning journey in detail. Therefore, the stories of a group of key informants who contributed their work and perspectives on learning to the research study were used to provide a student perspective on the learning experiences of students’ in the three research cohorts. The following will attempt to capture the uniqueness of each of the key informant learners in the research cohort in their own terms, acknowledging their individual lifeworld and educational experiences. Through understanding the learners as individuals, it will be possible to more fully assess the impact of *Learning by Design* on their learning as the data from the research study is later analysed.

4.3.1 The Senior Students of Proficient Primary School

Julia, Trent, Sam, Marie and Rob all belonged to the same class and have shared many experiences in their years at Proficient Primary School as they all began their learning journeys in kindergarten at this school. At times throughout the years they have been members of the same class and worked on the same learning programs. They have participated in shared school community activities including assemblies, sports days and camps. Yet their stories revealed different learning journeys with diverse lifeworld experiences and varied interests and aspirations.

4.3.1.1 Julia

Julia, an eleven year old in her last year of primary school, exuded a quiet confidence. Her teachers described her as a capable student who always completed set tasks. In many ways, Julia could be considered to be an ideal student with the ability to work independently and showing an interest in most learning activities. She especially emphasised her interest in music and the visual arts:
I like music and drama, and my dad got me into art but I know absolutely nothing about technology. I like science and integrated studies because in science we’re always learning something new and we get to experiment with little bits and pieces we’re learning about.

Her teachers also praised her social skills which were evident in her generally positive interactions with her peers and teachers. However, this did not mean that she did not experience any difficulties with her peers but rather that she was effective in monitoring and managing her working relationships, making it easier for her to participate successfully in group activities. As an example, Julia described one such situation and how she chose to resolve it:

I swapped because I had difficulties with my previous table group. It worked out really well.

Julia’s love of animals and her desire to help them led her to aspire to become a vet. In her usual philosophical way, she described her reasons for this aspiration as well as reflecting on a possible negative aspect to her career choice:

I am going to be a vet. I’ve always wanted to be a vet cause I love animals. I want to help them even if it meant putting them down if it was best for them.

This mature, reflective attitude was also evident in her perspectives on learning. Although, like most students, Julia wanted the learning to incorporate an element of “fun” she particularly valued learning programs that challenged her existing ideas and exposed her to new experiences.

4.3.1.2 Trent

Trent, like Julia, was an eleven year old in his final year of primary school. At the beginning of the year, his teachers considered Trent to be under-performing and needing additional assistance with his work. Although Trent actively participated in class discussions, he was not always as enthusiastic about written activities. In candidly speaking with his teacher, he also admitted that in the past he had not always produced his best work. However, in discussion type activities he displayed very decided opinions and at times found it difficult to wait for his
Trent expressed an enjoyment of artistic activities including learning activities where he could provide a visual response. He partly attributed his interest in visual arts to his mother, describing her artistic skills with great pride. This interest in the arts also included a love of music:

I like music a lot. It’s a lot more hands on type things. Music you can listen to it.

Trent also expressed an enjoyment of other active pursuits including “BMXing” and skating revealing:

I’d like to learn about BMXing and skating. I know from experience, I know how to do it and it’s a world of fun.

Trent was also enthusiastic about football. This was a popular pastime of choice in the playground for Trent and his peer group. It was also a common topic of conversation.

Trent, like Julia, revealed that he had already thought about career choices with his chosen career reflecting his previously described preference for hands on type activities:

I’ve thought about it because in my monologue that’s what I’m going to do. I want to be a mechanic so if your car breaks down you can fix it so you save money and it pays good.

This practical perspective was also reflected in Trent’s preference for learning activities where he could see a clear purpose with links to his lifeworld experiences and that had real world applications.

4.3.1.3 Marie

Eleven-year-old Marie was in her final year of primary school and although she had spent all her primary school years at the same school she did not really have an established friendship group. Her social focus revolved more closely around her home and extended family connections with Marie sharing many stories of special social occasions with her extended
family. At school, she also included a younger family member in some of her playground activities, acting as a support for her during her first year at school. With her social relationships in the classroom, she revealed she sought advice from her teacher to assist her to find a suitable work group with Marie reflecting, “I’m learning more with them so I actually think it was a good thing.”

Despite some additional assistance with language and literacy learning in earlier school years, at the beginning of the year, academically, Marie fluctuated between assisted and autonomous competence. The focus for Marie was on building her thinking skills both academically and socially. Beyond completing tasks, Marie’s teacher wanted her to genuinely engage with the subject matter, to think more critically about actions and to understand the causal links between actions and consequences. At the same time, Marie’s teacher wanted to focus on building Marie’s literacy skills, especially her comprehension and sentence structure.

At school, Marie enjoyed both arts and science activities. Her artistic interests were evident in the care she always displayed with the presentation of her written work and in the art and craftwork she produced. Marie revealed that her aspiration was to become a fashion designer:

    I’d rather like to design clothes because now when I like to draw I like to draw clothes. I like to draw people with lots of different types of clothes.

Like Trent, Marie also expressed a preference for learning about subjects that were in some way personally significant and were of real world importance.

4.3.1.4 Sam

Sam was a ten year old in his second last year of primary school. He was an independent learner with a strong preference for individual activities expressing some frustration with group work:

    I like to work on my own. It’s easier. Most of my friends don’t listen … and they never agree.

His teacher’s goals for him were to increase his engagement with the learning, to extend his thinking skills, and to apply his learning and creativity more broadly beyond the topic. She also wanted Sam to work on his communication skills to enable him to more effectively
explain his ideas to others and to build his written skills through the use of more complex sentences.

Sam, like Trent, clearly stated, “I like one’s where you get to express your own opinion.” Further reflecting on the previous school year, he felt that the work was too easy for him. He expressed a preference for more challenging activities that would help him with future learning and activities where he could use his imagination such as creative writing. In describing his creative writing endeavours, he revealed how he approaches his work stating, “If you write a story and it doesn’t quite turn out right, you can make a goal and improve it later.” Later, he asserted that one of the things he especially liked about his teacher was that she would tell them how they could improve their work, further revealing his focus on performance and improvement.

Sam had already reflected on his aspirations for the future in earlier conversations with his sister, indicating that he had given the matter considerable thought and had reached the conclusion that:

I don’t want to drop out. I want to go all the way and go to university and I want to get a doctorate. And my second idea is I want to be a scientist. You get to research a lot and you get to find out about diseases and that can help a lot of people all over the world. And may be a doctor. I’ve always wanted to see what it would be like in a surgery.

Although Sam had a strong interest in science-based activities, he also enjoyed music and playing a variety of instruments.

4.3.1.5 Rob

Eleven-year-old Rob was a cooperative, well-liked student who enjoyed positive relationships with his peers and teachers. He had a solid friendship group that played together, both at school as well as on weekends and during the school holidays. Generally, Rob was a relatively quiet student; however, he could become quite animated when talking about football or music. This same animation was also evident when he encountered challenging and interesting learning activities sharing his enthusiasm with his intimate peer group or trusted adults. Although he was not forceful in expressing his opinions, when called on for his viewpoint his responses were thoughtful. For example, in reflecting on a world without role
models like master artists he said, “we wouldn’t be able to set our goals with no masters to inspire us.”

Unfortunately, throughout his schooling Rob had found literacy learning challenging, receiving additional learning support since the early years of schooling. Still at the beginning of his final year of primary school, in his teacher’s words, “I perceived him as quite weak.” This was also reflected in his assessment where he was recorded as operating largely at the assisted competence level. As he would be entering high school the following year, the pressing concern for his teacher was the improvement of his literacy skills to enable him to work relatively independently in the high school setting. Rob himself was aware of his literacy difficulties and worked hard on improving his skills in this area. Rob was fortunate in that he received ample familial support and encouragement with his parents actively participating in activities within and outside the school context to assist him with his learning.

4.3.2 The Junior Students of Proficient Primary School

The stories of David and Kate below highlight the experiences of some of the younger learners in the research study, students who had just embarked on their formal learning journeys. For these learners, this first year was one of new experiences with new people to meet and new facilities to explore as they moved away from the more contained preschool environment to the open playgrounds and specialist spaces and facilities of the primary school.

4.3.2.1 David

David was one of the youngest members of the research cohort, celebrating his fifth birthday during the first school semester. In many ways, his interests still focussed largely on activities outside the learning context with David describing his favourite activities at school as:

…Going down to the oval to catch butterflies but it’s not a good day today. They won’t be out. I don’t like rainy days but I like playing with my friends.

Initially, his teacher was concerned that he may need additional assistance to settle into the formal school environment as he was younger than the rest of the class. However, within the classroom he appeared on the whole to be a serious and focussed worker. He was always cooperative and was never observed distracting others. Her focus for David was also on building his early literacy skills as he was very much a beginning reader and writer.
4.3.2.2 Kate

Like David, five-year-old Kate was in her first year of formal schooling. However, Kate appeared more confident and outgoing with a solid circle of friends. She would actively seek out people to help in the classroom and willingly participated in classroom routines and chores. Kate already also possessed some early literacy skills and enthusiastically participated in literacy activities displaying confidence in her own abilities. She also demonstrated perseverance in completing activities that required additional effort and time.

Although Kate had settled well into this new formal learning environment especially enjoying the social interaction of working with her friends, she still valued the security of a close connection between her home and school. The presence of an older sibling in the school as well as her parents’ participation in school events was important to Kate. This close connection appeared to enhance her enjoyment of school based activities.

4.3.3 The Students of Novice Primary School

The stories of Mark, Emma, Mandy, Rose and Steve capture a snapshot of the diversity of the research cohort at Novice Primary School. Openly and honestly they assessed their educational experiences as well as their own strengths and weaknesses to reveal the connections and disconnections between their learning experiences and their lifeworlds. They also shared their anticipation of entering high school and their aspirations for the future.

4.3.3.1 Mark

Mark was eleven years old and eagerly looking forward to starting high school next year, describing his visit to the local high school with great enthusiasm. It was evident that he had great expectations of all the things he would learn the following year. Mark was articulate and opinionated, unafraid to express his feelings about learning activities. Fortunately, for Mark, his teachers accepted even his more critical comments with good humour with Mark enjoying a positive and relaxed relationship with both his teachers and his peers.

His teachers considered him to be a confident and independent worker but requiring support with his written work. Mark himself was acutely aware of his difficulties with writing:

I’m not good at writing. I have really bad spelling and my writing is messy, almost impossible to read.
In looking at Mark’s work samples, his handwriting could not be considered to be impossible to read although it was evident that he experienced difficulty with both his handwriting and spelling.

In contrast to his negative perceptions of his writing abilities, Mark expressed a passion for maths activities, finding them to be both easy and enjoyable. He confessed to pestering his teacher for more challenging activities, including algebra stating, “algebra is so hard, it’s fun.” Accompanying his enthusiasm for maths was an interest in science, complaining that there were not enough science activities at school. In discussing his aspirations for the future, Mark considered a career in science or engineering because of his love of maths, science and construction. Whimsically, he noted:

Science is fun. It’s the best job in the world or may be testing chocolate, anything to do with science.

He considered maths and science to be complementary activities just like writing and language noting that his sister was very good at language activities while he was good at maths.

4.3.3.2 Emma

Emma was eleven years old and in her final year of primary school. She was considered to be an articulate, confident and capable student by her teachers. Enjoying the social aspects of schooling, the goal for Emma was to also maintain her learning focus with Emma herself commenting, “I’m more of a school person, you get to see your friends and you get to learn.” She appeared to genuinely enjoy school and had a general love of learning that extended to activities outside of school. It was evident from Emma’s comments that her learning endeavours were supported by her extended family with Emma describing how her father and grandfather were teaching her a second language. She also revealed how her grandfather had encouraged her to improve her vocabulary and spelling by using the dictionary.

Emma attributed her social confidence to the fact that she had travelled a lot and changed schools frequently so she was accustomed to different people and was able to make friends easily. Although Emma revealed she was bullied at a previous school, this did not appear to have dented her confidence or her enjoyment of school. Even though Emma was very social,
she reflected that she also enjoyed experiencing things on her own including reading. In describing her love of reading, she revealed some of her approach to learning commenting that “some of the books are really hard for me to read so I read the easier ones first so I can get ready to read the hard ones.” Not only did Emma enjoy reading stories but she also enjoyed creating stories of her own especially if she was writing them for an audience. Commenting on her work in maths, Emma stated:

When I do it my brain functions in a weird way and I can do it. When I was little I got very hard maths so it made me good at it.

This revealed that her confidence was not limited to literacy activities with Emma enjoying maths as well.

In addition to her interests at school Emma described a wide range of other interests including music admitting to enjoying listening to the songs from when her parents were young. She played the euphonium and was looking forward to learning to play the trumpet in high school. In discussing her aspirations for the future, she canvassed a number of possibilities including becoming a teacher, a vet or even the president. During this discussion she also revealed her concerns for the world stating, “I’d like to teach kids and make them feel better because the world’s not the same as it used to be.”

4.3.3.3 Mandy

Eleven-year-old Mandy was an unobtrusive worker and independent learner with a professed enjoyment for reading and listening to stories. She was also articulate and able to explain her ideas when called on, with Mandy herself commenting, “My parents have taught me to explain why I’ve done things so sometimes if I can give a good reason I won’t get into trouble so I’m good at explaining things.”

Activities requiring imagination and visual forms of expression held particular appeal for Mandy with her complaining about written activities and the need “to write everything down.” This was despite the fact that she enjoyed creative narrative writing. She revealed a particular interest in visual arts:

My favourite thing at school is art. It’s just been in my family. My mum is a really good artist… You get to describe the story through pictures and use your imagination.
Mandy at times, created the impression that she had many more ideas whirling in her imagination than she ever had the opportunity to express to others in the classroom context. She also expressed a preference for listening to or reading written texts as opposed to movies because this provided greater scope for her imagination, enabling her to create pictures in her head.

Although Mandy was able to complete tasks independently, she still enjoyed social interactions with her peer group. She explained that if she were given the opportunity she would readily change desks to work with friends. Giving her reasons she stated, “I like to work in a group because then you get other people’s opinions and if you’re stuck they can help you or if they’re stuck you can help them so it’s better.”

Mandy was still undecided about her ultimate future career choice although she was considering a number of possibilities:

There’s a heap of stuff. When I was little I wanted to be a vet and then I wanted to be a nature reserve person and at the moment I want to be an actress with Wakikirri and all. We’re in the finals.

This reflected Mandy’s diverse interests including her enjoyment of a range of different types of creative activities.

4.3.3.4 Rose

Rose, like Mandy, was in her final year of primary school. Although Rose did not appear shy and confidently shared her opinions, she revealed that she had a strong dislike of activities that involved any sort of performance in front of the class. This included activities such as reading in front of the class even though she was a capable reader, declaring, “I’m just not good at speaking and reading in front of big groups.”

In describing her favourite activities at school, she professed an enjoyment of sport and art:

Sport because it’s a lot of fun to be outside and running around. Art because I like drawing and colouring in and learning new things to do.
From these interests, it may be easy to assume that Rose was not academically inclined, however, she revealed herself to be a capable writer expressing her ideas fluently in writing. At the beginning of the year, she was already using complex sentences and appropriate punctuation. Her preference was for creative activities where she would be learning something new.

Rose indicated a dislike for maths feeling that she was not good at it and expressing frustration with the fact that “I get a lot of simple questions wrong because I rush.” At the same time, she indicated that she liked harder activities. Overall, Rose created the impression that most activities presented little challenge for her. However, she still expressed an enjoyment of school and learning. For Rose an important component in engagement with learning was the element of fun in the learning. Interestingly, she made few links between her learning at school and outside interests. Also unlike many of her peers, Rose expressed no aspirations for the future but rather was uncertain about which interests she might pursue.

4.3.3.5 Steve

Steve was an articulate and socially confident eleven-year-old in his final year of primary school. Adding to his confidence was his outside interest in speech and drama activities in which he engaged frequently. Academically his teachers considered him to be a capable, independent learner. Steve professed creative writing to be his favourite subject. However, he felt that he wasn’t particularly skilled at spelling. Accompanying his interest in creative writing was an enjoyment of reading. Steve also expressed an interest in science especially “trying out all the different experiments.”

In contrast to his positive perceptions of language and science activities, Steve expressed a strong dislike of maths. He drew a revealing contrast between his enjoyment of integrated studies in the morning and maths in the middle session:

Maths is in the middle session and it gets annoying. We usually do heaps of the same stuff and we’ve just done fun stuff and then everyone groans.

He particularly disliked activities involving rapid recall such as multiplication tables. However, he did balance this by saying that he did enjoy the dice game and algebra.
Overall, Steve preferred activities in which students were actively involved such as games and simulations. He explained that this made the activities more enjoyable. Despite Steve’s interests in language and drama activities, ultimately he aspired to a sporting career, declaring, “I love most sports and I’m pretty good at them.” He indicated that he wanted to further improve his skills in this area.

4.3 Telling Tales

These student background stories begin to create a picture of diverse student populations not defined by their gross demographic differences but by their underlying lifeworld differences. Each learner’s story presents the individual dispositions, interests and learning preferences of the learners. They highlight the different lifeworld experiences they bring to the learning context and by the time they have reached the senior years of the primary school the decided opinions they have formed about their past learning experiences. They demonstrate their awareness of their own strengths and weaknesses as learners along with the different strategies they use to approach learning in the school context.

A rich picture of student diversity begins to emerge posing a challenge to teachers to create learning designs that engage all students with their myriad of differences in meaningful learning experiences, experiences that enable their students to use these differences to enrich their own learning as well as the learning of their peers and prepare them for the new knowledge workplaces of the twenty first century. By examining the data from all the students in the study, including these key informants along with the learning elements and the data from the teachers, it will be possible to develop a clearer understanding of the successful features of learning designs that address this diversity. The designs will be examined for the two key conditions of learning, belonging and transformation, as defined by Kalantzis and Cope (2005). In the following chapters, the data will be analysed to reveal how these conditions are created through the learning design. In chapter 6, we will meet these key informants again as they discuss their personal experiences with the learning elements designed using the Learning by Design framework.
Chapter 5

A Triple Lens Analysis of New Learning

This chapter examines the data for evidence of the two key conditions of learning, belonging and transformation. In this light, it will explore the role of students and their teachers in the learning process and examine how student subjectivities are engaged in this process. The chapter will also highlight the types of learning occurring in classrooms using the *Learning by Design* framework and explore how this supports students to achieve success at school and prepares them for new and evolving forms of work and community participation.

5.1 Designing for Belonging and Transformation

Although much concern has been expressed about declining literacy standards, including in the report on the most recent PISA testing in ACT schools (Thomson & de Bortoli, 2008), there appears to be a greater crisis looming in education. This is the crisis of alienation and lack of engagement with school learning. Many educational researchers have expressed increasing concern over this issue including Rowe (2003), Kenway and Bullen (2005), Lingard (2007) and Ritchhart (2007). It is also of concern as a result of the finding in the PISA testing of 2000 that closely linked engagement with literacy performance in Australia. This indicated that it was more significant than the effects of gender and socio-educational status (Frydenberg et al., 2005).

Recognising the importance of engagement for student learning, in their work on new learning, Kalantzis and Cope (2005) identified belonging as one of the two key conditions of learning. In their definition of belonging there is a strong emphasis on both the learner and the learning:

In order to learn, the learner has to feel that the learning is for them. They have to feel they belong in the content; they have to feel they belong in the community or learning setting; they have to feel at home with that kind of learning or way of getting to know the world. In other words, the learner’s subjectivity and identity must be engaged (Kalantzis and Cope, 2005, p.43).
In this definition, there is a strong sense of learning as a personal experience that connects with the individual learner. To fully understand the relationship between the learner and the learning, it is necessary to also examine the second key condition of learning, transformation. If the focus was on belonging alone, there may be a tendency to stay with what is familiar, comfortable and safe for the student. However, in combining our understanding of belonging with the importance of transformation, our learning design may look very different. For Kalantzis and Cope (2005):

Learning is a journey away from the learner’s comfort zone, away from the narrowness and limitations of the lifeworld. As much as learning needs to affirm identity and create a sense of belonging, it is also a process of travelling away from the familiar, everyday world of experience. This journey is one of personal and cultural transformation (pp.47-48).

Again the emphasis is on learning as a personal experience; however, it also introduces the element of the new and challenging as important components of learning. In a sense, for Kalantzis and Cope, learning is that which occurs when the personal experiences of learners are activated in the pursuit of new, deeper and broader knowledge and understandings.

Although the Learning by Design framework does not directly address the alienation issues associated with the adult-controlled nature of traditional schooling institutions as described by Valentine (2000), it provides teachers with a means to make a difference in the context of their classrooms and the learning designs they create for their students. Therefore, in analysing the designs of teachers using the Learning by Design framework, it is important to identify the presence of the two key conditions of learning, belonging and transformation, and explore how these two conditions of learning are created through the design and its enactment. Using the data from the research study, it is also possible to evaluate the broader impact of Learning by Design on student learning.

5.2 Identifying Patterns in the Data

The Students Learning by Design study uses authentic classroom data generated by the students and teachers in the course of their everyday activities on their learning journey. This data includes the teacher designed learning elements, student responses in the form of learning journals and conversations, and teacher assessment records. It focuses a triple lens on the data to investigate how belonging and transformation are created in classrooms using
Learning by Design. The data is examined through the lens of the eight knowledge processes in the Learning by Design framework, the six features of new social environments as identified by the research literature, and through student performance measures.

5.2.1 Learning Designs

The starting point for exploring the learning journeys of the students in this research study is the teacher designed learning elements. These teacher created maps of the learning journey ahead are a window into the decision-making processes involved in the design, revealing the teachers’ purpose, pedagogical choices and intended outcomes. Three learning elements were analysed in this study, one from each research cohort. These learning elements have been labelled A, B and C.

Learning element A was designed for senior school students at Proficient Primary School. The design integrated Studies of Society and Environment, values (responsibility), literacy and science around an in depth study of “the importance of water and the impacts of human use on the environment, catchment areas and the water system…” (Learning element A, 2007, p.6). The design incorporated a strong values component consistent with the national values education framework with an emphasis on personal responsibility for environmental actions and personal accountability for learning especially in collaborative contexts.

The learning element was designed around a web-based resource that engaged students nation-wide in a competition to solve a scientific mystery. The students were engaged in learning activities involving the eight knowledge processes of Experiencing the Known, Experiencing the New, Conceptualising by Naming, Conceptualising by Theorising, Analysing Functionally, Analysing Critically, Applying Appropriately and Applying Creatively. The following details the knowledge objectives of these learning activities:

Experiencing

- Identify the difference between natural and man made environments
- Develop knowledge about the ways people control the conditions in the environment they build.
- Learn how people’s activities impact on the balance of the natural world and how physical phenomena may change the environment.
- Knows what qualities are important when working effectively with others.
**Conceptualising**

- Identify and collect data relating to environmental impacts
- Identify values that demonstrate a responsible attitude towards the environment and group cohesiveness.
- Name and label the water cycle and features of water catchments.

**Analysing**

- Interpret data to support or refute a particular prediction.
- Analyses own behaviour and how that contributes to a team.
- Discovers responsible uses for water.
- Identifies impacts on catchments and river areas.

**Applying**

- Apply cooperative skills and strategies to all situations.
- Modify and apply data in order to predict a solution to environmental issues.
- Develop a management plan by designing, making and appraising.
  
  Identify how to use water and take care of the environment responsibly. (Learning element A, 2007, pp.7-8).

The learning activities corresponding to these learning objectives were designed to provide the students with the knowledge and skills to effectively engage in solving the mystery and to develop in depth understandings of the issues surrounding human use of water resources.

Learning element B was designed for senior school students at Novice Primary School. This design focussed on an in depth study of fairytales incorporating literacy, and the performing and creative arts. The learning element was designed to engage students in the reading and writing of narrative texts with an emphasis on the grammatical and structural features of these text types. The learning element was also designed to provide students with the opportunity to explore the creative presentation of ideas using communication technologies, drama and the visual arts. The learning objectives of the learning element were:

**Experiencing**

To contribute to group effectiveness

- Working with others in pairs, small and large groups
- Roles and responsibilities and individual accountability of themselves and others within a range of group and team contexts
Allocate and undertake varying roles and tasks in groups displaying cooperation and flexibility when planning a presentation

**Conceptualising**

Student writes effectively

- Uses a formal, logical structure
- Writes texts to entertain
- Using ways in which extended groups of nouns, adjectives and adverbs can be used to develop characters, setting and plot

**Analysing**

Student reads effectively

- By including evaluative comments on the text
- By understanding the many possible concurrent purposes of authors
- By demonstrating an awareness of the meaning of language used in a range of classic and contemporary texts
- With an understanding of language features used by authors to engage readers and express an author’s opinion

Student critically interprets and constructs texts by

- Understanding different modes used in texts they view, listen to and read – eg music, print, voice
- An understanding of the ways creators and designers select information to suit a purpose
- An ability to examine how characters, people and events are represented in different texts and offer alternatives
- An awareness of how certain views and ideas are communicated through the inclusion or exclusion of certain information
- Understanding ways in which authors can influence their audience

**Applying**

Student speaks with purpose and effect by

- Understanding the use of speaking and listening to clarify ideas and understandings
- Speaking and listening in discussions, conversations and oral presentations
- Using appropriate language in formal and informal contexts
- Using language to suit audience
- Speaking with clarity, using facial expressions, movements, gestures, and volume and tone to enhance expression of ideas
• Listening respectfully and encouraging others to speak.

Student creates artistic work by

• Interpreting a dramatic context by responding in dramatic form
• Talking about the significant features and elements of their own artistic works
• Creating a range of roles and situations adapted from their imagination
• Using different materials, skills and processes to make 2D and 3D artistic works. (Learning element B, 2007, pp.6-7).

Using the eight knowledge processes of Experiencing the Known, Experiencing the New, Conceptualising by Naming, Conceptualising by Theorising, Analysing Functionally, Analysing Critically, Applying Appropriately and Applying Creatively the students were engaged in an examination of different versions of well known fairytales including film versions of these stories. Through the study of these different fairytales, students were engaged in building understandings about the structure of narrative texts and their specific features. The learning design also supported students to explore the different devices used in written and film narratives to create perceptions of characters including stereotypes.

Learning element C was designed for junior school students at Proficient Primary School. The key focus of this learning design was on the building of social skills to support students in establishing and maintaining friendships, and in developing effective learning behaviours such as listening to others. The learning element also included a strong literacy component with narrative texts chosen as the vehicle for exploring issues around friendships. Throughout the learning activities designed around the eight knowledge processes of Experiencing the Known, Experiencing the New, Conceptualising by Naming, Conceptualising by Theorising, Analysing Functionally, Analysing Critically, Applying Appropriately and Applying Creatively the students were engaged in producing oral, pictorial, gestural and written responses to the issues under examination. The learning objectives of these learning activities are detailed below:

Experiencing

• Personally responds to what friendship means to them. What is a good friend?
• Define what a friend looks like and sounds like.
• Personally respond to friendship issues raised throughout the Learning Element.

Conceptualising
• Identifies 5Cs – Caring, Consideration, Cooperation, Courtesy, Common Sense and can demonstrate a basic understanding of these concepts.
• Explore other concepts eg Inclusivity through experiencing ‘What if’ scenarios and Y Charts

**Analysing**
• Describes what friends are; what they sound like, the type of things they do, etc
• Identifies some characteristics that affect relationships.
• Identifies some basic ways to resolve conflicts.
• Analyze the role caring, consideration, courtesy, cooperation and inclusivity play in friendship.

**Applying**
• Applies their friendship knowledge to real life situations eg uses appropriate ways to greet others, share and include others.
• Demonstrates many of the qualities needed to be a good friend. (Learning element C, 2007, pp.7-8).

The learning element was designed to build a link between the children’s lifeworld experiences in the home and the wider community with their new experiences at school. In this way, new learning was designed to build on their existing understandings and experiences of establishing and maintaining relationships with others. The learning element created opportunities for the students to practise and reflect on these social skills in order to build their confidence in approaching new social situations and enhancing their ability to work effectively with others.

Using the lens of the eight knowledge processes from the *Learning by Design* framework, an initial scan of the three learning elements was conducted to assess the balance of processes used and to reveal the pedagogical choices of the teachers in designing their learning elements. This involved tabulating the number of activities under each of the knowledge processes against the number of overall activities in the learning element for each of the learning elements. The percentages were rounded to the nearest whole number. This would show whether any of the knowledge processes had been omitted altogether or whether there was a difference in the overall deployment of each of the knowledge processes across the three learning elements. The results of this scan are recorded in the table below:
From the table we can see that all eight knowledge processes are represented in each of the three learning designs. Overall, there appears to be a relatively even spread over the four basic knowledge processes of *Experiencing*, *Conceptualising*, *Analysing* and *Applying* in the three learning elements. However, over the more finely tuned eight knowledge processes of *Experiencing the Known* and *Experiencing the New*, *Conceptualising by Naming* and *Conceptualising by Theorising*, *Analysing Functionally* and *Analysing Critically*, and *Applying Appropriately* and *Applying Creatively*, differences become apparent and interestingly, these differences are consistent across the three learning elements. This may indicate that there was consensus among the four teachers in the study as to the relative importance of these knowledge processes to the learning of their students.

When looking at the knowledge processes of *Experiencing the Known*, *Conceptualising by Theorising* and *Applying Creatively*, we find that across the three learning elements there are fewer activities under these knowledge processes than under the knowledge processes of *Experiencing the New*, *Conceptualising by Naming* and *Applying Appropriately*. It may be that from a teacher perspective these three knowledge processes of *Experiencing the New*, *Conceptualising by Naming* and *Applying Appropriately* represent more certainty with students largely engaged in teacher designed shared experiences, explicit instruction and structured demonstrations of learning. Whereas, in the knowledge processes of *Experiencing the Known*, *Conceptualising by Theorising* and *Applying Creatively* there may be greater potential for students to introduce unexpected elements to the learning activities requiring greater flexibility when teaching and assessing learner outcomes. Overall, at this point in the analysis using the knowledge process lens we find there is little difference between the three

<table>
<thead>
<tr>
<th>Learning Element</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Known</td>
<td>The New</td>
<td>By Naming</td>
<td>By Theorising</td>
</tr>
<tr>
<td>A</td>
<td>5%</td>
<td>23%</td>
<td>21%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>28%</td>
<td>31%</td>
<td>25%</td>
<td>15%</td>
</tr>
<tr>
<td>B</td>
<td>5%</td>
<td>25%</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td>35%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>C</td>
<td>7%</td>
<td>13%</td>
<td>20%</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>20%</td>
<td>27%</td>
<td>26%</td>
<td>27%</td>
</tr>
</tbody>
</table>
learning elements indicating there is a degree of pedagogical consistency across the research sites. This may also indicate that the Learning by Design framework is prompting the teachers to incorporate all of the knowledge processes into their learning designs.

Following this initial scan of the data, the learning elements were coded for evidence of the six features of new social spaces as identified in the research literature: personal connections (Kalantzis & Cope, 2005; Lingard, 2007), explicitness of goals and expectations (Alvesson, 2001; Ritchhart, 2007), knowledge complexity and intellectual challenge (Darling-Hammond, 2006; Warner, 2006), interactivity (Burbules, 2004; Gee, 2004, 2006), a shared language (Brown, 2006; Gee 2006), collaboration and knowledge sharing (Jenkins et al., 2006; Woiceshyn & Falkenberg, 2008). As outlined in the research design, activities in the learning elements were individually assessed for evidence of these features based on the teachers’ descriptions of these learning activities, which were then tabulated against the number of overall learning activities within the element to produce a percentage.

<table>
<thead>
<tr>
<th>Learning Element</th>
<th>Personal Connection</th>
<th>Explicitness</th>
<th>Intellectual Challenge</th>
<th>Interactivity</th>
<th>Shared Language</th>
<th>Knowledge Sharing &amp; Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>69%</td>
<td>85%</td>
<td>56%</td>
<td>92%</td>
<td>21%</td>
<td>44%</td>
</tr>
<tr>
<td>B</td>
<td>5%</td>
<td>60%</td>
<td>55%</td>
<td>70%</td>
<td>30%</td>
<td>55%</td>
</tr>
<tr>
<td>C</td>
<td>100%</td>
<td>93%</td>
<td>53%</td>
<td>100%</td>
<td>33%</td>
<td>100%</td>
</tr>
</tbody>
</table>

From this examination of the data some differences in the designs began to emerge. The most noticeable difference was the level of personal connection evident in learning element B in comparison to the other two learning elements. At five percent, it was much lower than the levels recorded in learning elements A and C. Although less marked, there was also a difference in the level of explicitness and interactivity in learning element B compared to learning elements A and C with learning element B recording lower levels for both these features. These differences will also need to be considered in light of the students’ response data to determine whether these influenced the students’ sense of belonging and ultimately the level of learner transformation in research cohort B. These will be explored later in sections 5.2.2 and 5.2.3 that focus on student performance and response data. Interestingly, the two senior primary learning elements A and B recorded lower levels of knowledge sharing and collaboration than learning element C that was designed for younger students which may result from a greater emphasis on independent learning in the senior primary years of
schooling. The levels for intellectual challenge and shared language were relatively consistent across the three learning elements. From this we can infer that the Learning by Design framework was influencing the incorporation of these features into the learning designs. The following examination of the learning elements may shed further light on the specific knowledge processes within the framework that impacted on the incorporation of these features.

The knowledge process lens was overlaid with the features of new social spaces to determine the distribution of these features across the eight knowledge processes. This involved overlaying the evidence of the features of new social spaces over the learning activities under each of the eight knowledge processes. These were tabulated separately for each learning element with the percentages calculated against the number of learning activities overall in each learning element. These distribution patterns were used to show the interrelationships between the features and the knowledge processes, to reveal how the knowledge processes influence the presence of these features in classrooms engaged in Learning by Design.

Table 5.3 Results of cross tabulation of features and knowledge processes in learning elements

<table>
<thead>
<tr>
<th>Features</th>
<th>Element</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>The Known</td>
<td>The New</td>
<td>By Naming</td>
<td>By Theorising</td>
</tr>
<tr>
<td>Personal</td>
<td>A 100% 44% 50% 25%  100% 83% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>B 100% 0% 0% 0% 0% 0% 0% 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 100% 100% 100% 100% 100% 100% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicitness</td>
<td>A 100% 67% 75% 50% 100% 100% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B 100% 0% 0% 67% 100% 50% 50% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 100% 100% 100% 100% 100% 100% 100% 67% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual</td>
<td>A 0% 33% 50% 100% 75% 50% 75% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Challenge</td>
<td>B 100% 20% 50% 100% 50% 100% 33% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 100% 50% 0% 100% 100% 100% 33% 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactivity</td>
<td>A 100% 78% 75% 100% 100% 100% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B 100% 20% 67% 100% 50% 100% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 100% 100% 100% 100% 100% 100% 100% 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared</td>
<td>A 50% 11% 63% 25% 0% 0% 0% 0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This tabulation highlighted some interesting differences in the designs. When looking at the *Applying Appropriately* knowledge process, in learning element A there was more than twice the level of intellectual challenge than learning elements B and C. This contrasted with the level of knowledge sharing and collaboration with learning elements B and C recording high levels while in learning element A there was no knowledge sharing and collaboration in either of the applying knowledge processes. This would indicate that in learning element A, the learning activities in the applying knowledge processes were used almost as a form of individual assessment to determine the skills and understandings the students had acquired from the activities involving the other knowledge processes. Whereas in learning elements B and C, the applying activities were more in the form of culminating activities drawing together the learning acquired during the other knowledge processes.

Overall, the level of intellectual challenge was highest in the *Conceptualising by Theorising* knowledge process with a relatively high level of intellectual challenge also recorded in the analysing knowledge processes across the three learning elements. These were also marked by a relatively high level of interactivity and activities involving knowledge sharing and collaboration. It would seem that these conceptualising and analysing knowledge processes promoted more intellectually challenging forms of inquiry that required students to actively engage in working with knowledge. The teachers’ decision to employ collaborative and knowledge sharing strategies during these knowledge processes implies that there was a supportive link between these strategies and the more intellectually challenging learning activities.

As expected the level of personal connection was highest in the *Experiencing the Known* knowledge process while shared language was highest in the knowledge process of *Conceptualising by Naming* across the three learning elements. These knowledge processes within the *Learning by Design* framework acted almost as a form of insurance, ensuring that there was some focus within the learning elements on connecting the learning to the students’ lifeworlds and previous learning experiences, and that the students had opportunities to build
their understanding of the specialist language of the subject area. Interestingly, in learning element B the development of subject specific language occurred across the conceptualising and analysing knowledge processes while in learning element A it occurred across the experiencing and conceptualising knowledge processes. These differences may be attributed to the nature of the learning focus with learning element B specifically designed with a language focus while learning element A focussed on science. In learning element B, the students were able to use their existing language repertoire to describe their responses to the stories building the language of the subject area as they began to discuss specific textual features of the stories while in learning element A the students needed to use subject specific language during the experiencing knowledge processes to describe their responses to learning activities such as experiments. These differences indicate that the Learning by Design framework is flexible allowing it to be used for planning learning in different disciplines.

In examining the knowledge process of Experiencing the New, learning element B incorporated a lower percentage of activities involving both explicitness and interactivity than learning elements A and C. The levels of explicitness and interactivity were also lower in learning element B in the Analysing Functionally knowledge process. Again these differences in learning element B, will need to be considered in light of the students’ response data in section 5.2.2 to determine whether this in any way influenced on the students’ sense of belonging to the learning and the level of learner transformation within this research cohort detailed in section 5.2.3.

5.2.2 Learning Journals and Conversations

The teacher designed learning elements provided a starting point for the investigation of the students’ learning journeys. The next stage of the exploration involved a detailed examination of the students’ responses to these learning designs to determine how the designs translated into practice and their impact on students. To facilitate the matching of the designs with the students learning experiences the lens of the six features of new social spaces used in the analysis of the learning elements was also used to analyse the students’ responses. The results from both the learning journals (J) and conversations (C) were tabulated separately and then a combined total for the two sources of data was calculated for the six different features. Each research cohort’s results are recorded in separate tables allowing the low and high score as well as the median score for the features to be easily identified for each group. It must be noted that this examination of the students’ response data is in no way intended as a statistical analysis but rather the tables are intended to show the spread of responses within the different
cohorts. The term median is used to indicate the midpoint within the series of responses in the cohort. Where the midpoint consists of two numbers of equal value, the average of the two middle values is recorded as the median. The recording of the median along with the low and high scores is used to reveal the overall pattern of responses within the three cohorts. The table below presents the results for senior primary school students in research cohort A that worked on learning element A.

Table 5.4 Student response data for research cohort A

<table>
<thead>
<tr>
<th>Student Cohort A</th>
<th>Personal Connection</th>
<th>Explicitness</th>
<th>Intellectual Challenge</th>
<th>Interactivity</th>
<th>Shared Language</th>
<th>Knowledge Sharing and Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>20</td>
<td>27</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>8</td>
<td>11</td>
<td>24</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>11</td>
<td>6</td>
<td>39</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>16</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>8</td>
<td>10</td>
<td>28</td>
<td>33</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>13</td>
<td>4</td>
<td>19</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>11</td>
<td>2</td>
<td>23</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>7</td>
<td>9</td>
<td>31</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>14</td>
<td>7</td>
<td>28</td>
<td>31</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>10</td>
<td>4</td>
<td>31</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>13</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>14</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

108
All students in research cohort A made some personal connections to the learning with a cohort median of eight references. Eight of the fifteen students in the cohort recorded a score of eight or higher personal connections to the learning. This was accompanied with a high level of interactivity with a median score of twenty-three. References to the intellectual challenge presented by the learning was lower with a median score of six with eight of the fifteen students recording a score of six or higher. Evidence of the students’ explicit understanding of learning activities was relatively consistent across the cohort with eleven of the fifteen students recording the median score of seven or higher. The level of positive references to collaboration and knowledge sharing was high with a median score of twelve with all students making at least five positive references to these learning experiences. The use of subject specific language was also high in both the students’ journal entries as well as conversations with sixty percent of the students using twenty-two subject specific words or more. The response data shows that the learning design did influence the students’ learning experiences and the ways they were learning and their perceptions of these experiences. The language data also directly reveals student transformation in their use of subject specific language to describe their learning indicating that this language was now a part of their personal language repertoire.

The following table provides the results for the second senior primary research cohort that worked on learning element B.

<table>
<thead>
<tr>
<th>Student Cohort B</th>
<th>Personal Connection</th>
<th>Explicitness</th>
<th>Intellectual Challenge</th>
<th>Interactivity</th>
<th>Shared Language</th>
<th>Knowledge Sharing and Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>24</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>14</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>16</td>
<td>27</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>7</td>
<td>2</td>
<td>20</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>11</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>17</td>
<td>43</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>13</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>21</td>
<td>31</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>8</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>11</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>21</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>23</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>14</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>13</td>
<td>15</td>
<td>4</td>
</tr>
</tbody>
</table>

All students in research cohort B made some personal connections to the learning with eleven of the sixteen students recording the median or middle score in the series of five or more. The level of interactivity was even higher with a median score of 13.5 with all students recording at least seven instances of active participation in the learning. However, the responses to learning challenge as well as knowledge sharing and collaboration were much lower with median scores of three and 2.5 respectively. The level of explicit understanding of learning
activities was consistent across the research cohort with a low score of three, a high score of eight and a median of four with thirteen of the sixteen students recording the median score of four or higher. The use of subject specific language was high overall with a median score of twenty-one. It is interesting to note that in line with the lower levels of interactivity and explicitness as well as personal connection recorded in learning element B compared to learning element A, the students’ median scores for these features were also lower in research cohort B. This would indicate a correlation between the learning design and the students’ responses, revealing the direct influence of the learning design on the students’ learning experiences. The impact of this difference between the two learning elements on student transformation will be explored further in the analysis of the students’ performance data.

Like the learning journals used by the senior students in the study, the work samples record the junior primary students’ responses to the learning. With the younger students there was greater use of pictorial responses and scaffolded prompts to support their developing literacy skills. The learning conversations were highly informal occurring as the children participated in classroom activities with their friends. The table records the results of the coding process for the students in research cohort C.

Table 5.6 Student response data for research cohort C

<table>
<thead>
<tr>
<th>Student Cohort C</th>
<th>Personal Connection</th>
<th>Explicitness</th>
<th>Intellectual Challenge</th>
<th>Interactivity</th>
<th>Shared Language</th>
<th>Knowledge Sharing and Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
<td>J</td>
<td>C</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>10</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

111
All students in the research cohort made personal connections to the learning with the group recording a high median score of ten. Their explicit understanding of learning activities was also consistently high with a low score of six, a high score of ten and a median score of eight. However, the score for interactivity was lower with a median score of four. The level of intellectual challenge was even lower with a median score of zero. From the table, we can see that the median or response series midpoint score for intellectual challenge was zero with a low score of zero and a high score of three. This reveals a low spread of responses for intellectual challenge within this cohort. Only two children within this cohort made any references to intellectual challenge. An explanation for this low level of response for the younger students may be their focus on reporting whether an activity was enjoyable or not rather than on whether the learning activity was challenging or complex. In conversation with the younger students, overall they reported enjoying particular activities at school in more general terms rather than making specific comparisons between these activities and on the level of challenge involved in these tasks. It is also important to note that the students did not make any negative references to the work being too easy or boring. References to knowledge sharing and collaboration varied but tended to cluster around the median score of three references. Some of these references were in pictorial form reporting on activities shared with friends. There was evidence of all the children using subject specific language with five of the seven students in the study using the median of seven words or more. Most of these were in written form despite the fact that at the beginning of the learning element many of the students were beginning writers. This would indicate that the subject specific language of the learning element was becoming a part of their written as well as oral language vocabulary.

The table below provides a summary of the low score, high score and median or response series midpoint for each research cohort for the six features of new social spaces facilitating the process of comparing and contrasting the response data from the three research cohorts.

Table 5.7 Summary of student response data

<table>
<thead>
<tr>
<th>Features</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low score</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>High score</td>
<td>13</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Median</td>
<td>8</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Explicitness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low score</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>High score</td>
<td>14</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Median</td>
<td>7</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>
The table reveals some differences in the students’ responses to their learning experiences between the three research cohorts. The reason for these differences needs to be explored in further detail. A clue to these differences may be provided in examining the student response data for each cohort and cross-referencing it with the data from the corresponding learning element. From this cross-referencing some interesting parallels emerge opening up the possibility of a direct link between the learning designs and the students’ responses to the learning. For example, the median student response scores for personal connection and explicitness are mirrored by the percentages for these features in the corresponding learning elements. Research cohort C working on learning element C with the greatest percentage for personal connection and explicitness also recorded the highest student responses for personal connection and explicitness. While research cohort B working on learning element B with the lowest percentage for personal connection and explicitness recorded the lowest student responses for these features.

The students in research cohort A recorded higher response scores for intellectual challenge, interactivity, and knowledge sharing and collaboration than research cohorts B and C. However, when examining knowledge sharing and collaboration only 44% of activities in learning element A included this feature compared to 55% and 100% for learning elements B and C respectively. However, the level of positive responses from students was much higher for research cohort A with a score of twelve compared to median scores of 2.5 and three for research cohorts B and C. This would suggest that there was some type of qualitative difference between the knowledge sharing and collaborative activities or learning sequence in learning element A compared to learning elements B and C. This anomaly will be explored further in section 5.4.1 on knowledge sharing and collaboration with a more detailed analysis.
of the features of the learning elements and the students’ responses to these elements. Similarly, it was interesting to note although there was little difference between the three learning elements in the percentage of activities involving intellectual challenge and knowledge complexity, there was a difference in the students’ responses with research cohort A recording a higher median score. Again, from this it may be inferred that there was some type of qualitative difference in the activities between the learning elements that needs to be explored in more detail when elements of the learning designs are correlated with individual student responses especially in relation to the link between knowledge sharing and collaboration (5.4.1) and intellectual challenge (5.4.2).

5.2.3 Teacher Assessments of Products, Processes and Performance

Along the learning journey, students produced a range of products and participated in processes and performances providing evidence of their transformation. This evidence was evaluated and assessed by their classroom teachers, producing data demonstrating the extent of transformation in each research cohort. For the senior primary school cohorts this data was in the form of assessment rubrics while for the junior school students it was a graph of literacy performance.

The tables below record the teachers’ ratings of their students’ performance on the Learning by Design assessment criteria rubric (Kalantzis & Cope, 2006, p.100), at the beginning of the school year (A) and again at the end of the year (B) against the eight knowledge processes assessing whether they were performing at assisted competence (1), autonomous competence (2) or collaborative competence (3) level. The tables also record the overall shift in performance across the eight knowledge processes for each student as well as the overall shift for each knowledge process for the entire research cohort.

Table 5.8 Student performance data research cohort A

<table>
<thead>
<tr>
<th>Student Cohort</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
<th>Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
All students in research cohort A recorded a shift in performance with the cohort recording a low shift score of one, a high score of fourteen and a median score of eight. Only a third of students recorded shifts of less than six points with four of these students already operating largely at the collaborative competence level. Seventy-five percent of the students that recorded the greatest shift in performance were operating at the assisted competence level in some of the knowledge processes at the beginning of the year. This would indicate that the learning design especially impacted on the performance of students experiencing difficulty in achieving school success. When cross-referenced with the student response data from the learning journals and conversations (section 5.2.2), we found that of the students that recorded the median performance shift of eight points or above, 62.5% of these students also recorded the median score or above for personal connection, intellectual challenge, interactivity and shared language while 75% recorded the median or above for explicitness and 50% for knowledge sharing and collaboration. From this it can be inferred that these features were also significant in promoting student learning.

Interestingly, *Analysing Critically* was the knowledge process with the most students operating at the assisted competence level at the beginning of the year with nine students operating at this level. By the end of the year, only one student was still performing at the assisted competence level in this knowledge process while a third of the students were operating at the collaborative competence level. Therefore, we can infer that the learning design was supporting under-performing students with the development of high order thinking skills rather than just operational skills. The two applying knowledge processes had eight students in each operating at the assisted competence level at the beginning of the year
again with only one student still operating at this level at the end of the year. The greatest gains overall during the year were made in the knowledge process of Conceptualising by Naming at sixteen points with all but two students operating at the collaborative competence level by the end of the year. This was closely followed by the knowledge processes of Conceptualising by Theorising, Analysing Critically and Applying Appropriately at fourteen points each. It is evident from this that the learning design supported students in engaging in more intellectually challenging knowledge processes and it would suggest that there may be a link between Conceptually by Naming and these challenging knowledge processes.

The following table provides the performance data for research cohort B:

<table>
<thead>
<tr>
<th>Student Cohort B</th>
<th>Experiencing</th>
<th>Conceptualising</th>
<th>Analysing</th>
<th>Applying</th>
<th>Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New A</td>
<td>Known A</td>
<td>Naming A</td>
<td>Theory A</td>
<td>Functionally A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Research cohort B recorded a shift low score of zero, a high score of eight and a median score of 2.5. Overall, fifty percent of students in the cohort recorded no shift in performance with most of these students operating at an autonomous competence level at the beginning of the year and continuing to do so at the end of the year. This would indicate that learning element B was not as successful as learning element A in improving the performance of all learners. In light of the earlier learning element analysis, it may be considered that the lower levels of interactivity, explicitness and personal connection recorded in learning element B did indeed impact on the levels of student transformation in research cohort B. However, of the two students operating at the assisted competence level at the beginning of the school year in six knowledge processes, each made progress to record a shift above the median score at the end of the year so again under-performing students were making the greatest gains.

When cross-referenced with the data from the students’ learning journals and conversations, all the students that recorded shifts above the median score also recorded scores above the median for explicitness and shared language while seventy-five percent of these students scored above the median for personal connection. Of these students 62.5% also recorded responses above the median for intellectual challenge and fifty percent for interactivity, and knowledge sharing and collaboration. Therefore, we can infer that these features even when present at lower levels were also significant to the performance of students in research cohort B. Across the knowledge processes, there was a relatively even shift in performance with the knowledge processes of Conceptualising by Theorising and Analysing Functionally recording the greatest shift at eight points while Conceptualising by Naming, Analysing Critically, Applying Appropriately and Applying Critically recorded a shift of seven points each. Again, the greatest performance gains appear to be in the more intellectually challenging knowledge processes involving conceptualising and analysing.

Most of the students in research cohort C were in their first year of formal schooling. At the beginning and end of the school year the classroom teacher conducted the Performance Indicators in Primary School (ACT Department of Education, Youth and Family Services website, 2008) literacy assessment with each of her kindergarten students. This assessment engages students in completing a series of computer-based activities involving word recognition, decoding and comprehension. The results of the assessment are centrally processed providing each student with a standardised score and a performance indicator relative to other kindergarten students within the jurisdiction. The graph below, presented by the classroom teacher at the Elearning Symposium (2007), illustrates the level of student
transformation in reading in her class in comparison to the general first year student cohort based on this early years literacy assessment.

Figure 5.1 Graph of literacy results for research cohort C

From the above graph, we can see that although the class performed slightly below the general cohort of kindergarten students at the beginning of the year by the end of the year they were performing significantly above the cohort average. In addition, to this improvement in academic performance, the teacher noted changes in the students social skills with improved classroom and playground behaviours and a reduction in referrals to the “rethink room” for playground misdemeanours. This would indicate that the learning element had a positive impact on both the students’ academic performance as well as the development of their social skills.

5.3 Shared Passion for Learning

Working in traditional classrooms in Valentine’s (2001) terms “segregated by age” creating a shared passion for an area of study may pose a challenge especially as beyond the gross demographic differences between students there are also a myriad of lifeworld differences. For as Kalantzis and Cope (2005) pointed out: “measure any one underlying attribute of lifeworld difference and you will find greater internal difference within a demographically defined group than the average difference between groups” (p.45). The classroom is also a
different learning space to the affinity spaces described by Gee (2004), where people choose to interact in a virtual space based on a shared interest. So “the challenge, then, is how do we engage all learners in classrooms of difference? In other words, how do we do diversity?” (Kalantzis & Cope, 2005, p.46).

5.3.1 Explicitness

Gee’s work on affinity spaces can, however, provide clues on how to create a shared passion through his identification of some of the features of these spaces. The people participating in these spaces often share goals and practices. Ritchhart (2007) in describing classrooms where students are engaged also referred to a strong sense of purpose noting “their efforts feel directed toward a well-defined learning goal” (p.41). Systems of belonging based on the alignment of personal goals with those of an organisation are also increasingly common in contemporary workplaces (Cope et al 1997, Alvesson 2001, Kolehmainen 2004, Kalantzis & Cope 2005). These systems of belonging are designed to generate motivation and productivity as well as acting as an accountability mechanism. Today, members of project teams working for multinational companies do not always share a physical workplace but rather can be located in different cities across the globe. Therefore, an important component of building a shared passion and commitment to the project involves the communication of the goals and expectations for that project. The clear articulation of goals and expectations by the project manager shifts the responsibility solely from the manager to the team members, making them accountable for the achievement of set goals and standards as well as enhancing their personal commitment to the project.

Therefore, in the school context we would expect that the greater the students’ understanding of the teachers’ vision and the clearer their understanding of the teachers’ expectations, the greater the commitment and accountability of the students to the learning. Drawing on the data from the analysis on explicitness in the learning elements (section 5.2.1) and student responses in learning journals and conversations (section 5.2.2), we can examine the influence of this feature on students’ learning experiences.

Table 5.10 Cross-referenced data from learning elements and student responses on explicitness

<table>
<thead>
<tr>
<th></th>
<th>Explicitness in Learning Elements</th>
<th>Student Response Median Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>85%</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>60%</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>93%</td>
<td>8</td>
</tr>
</tbody>
</table>
From the above table, we can see that both data sources reflect a similar pattern with less explicitness identified in learning element B and the accompanying student responses. In examining the learning designs, it was discovered that this difference in explicitness occurred mainly in the analysing knowledge processes with learning activities in learning elements A and C recording higher levels of explicitness for *Analysing Functionally* and *Analysing Critically*. When cross-referenced with the performance data for research cohort B, it was evident that the students that recorded significant improvements in performance also scored above the median for explicit understanding of the learning.

Delving deeper into the students’ experiences of the learning elements their learning conversation and journal responses provide a more comprehensive picture. It is hard to forget Mark’s initial passionate response to the learning element on fairytales:

> My thoughts about the unit, I think it is stupid! Really they should do this in kindy.

However, in his later journal entries, he expresses a very different opinion:

> I’ve learnt a lot and I can’t express them all…We did our own complete fairytale with a book and everything called ‘Dragon and the Witch’. We got to put in anything we wanted in it.

One of the other focus students, Rose expresses similar sentiments at the beginning with her philosophical response:

> When our teachers said we will be doing fairytales it sounded a bit babyish, but you have to try new things.

And later,

> Now that I know things we will be doing it doesn’t sound that babyish, it sounds exciting.

From these comments, it would appear that Mark and Rose did not have a clear understanding of learning goals and expectations at the beginning of the learning element. In contrast, Trent,
Julia and Marie working on the environmental education learning element provide their assessment of what is different about this learning element:

It was a lot more brought together… you’re thinking a lot more from the start of the year.

My favourite thing about it was that you had to get all the clues and figure it out so it was a lot better than I thought it would be. It was interesting because you get this huge idea but then you had to learn about something else but you still needed that information because it was important so it wasn’t a straight line.

I liked doing it, every day we’d get new clues and we’d get closer to stuff every day.

When examining these responses closely, there appears to be a very subtle difference in their experiences. In the environmental education learning element, the students’ descriptions allude to a thread running through the learning that provides a central purpose to all their learning activities that was evident right from the beginning of the learning element. With the fairytale learning element, Mark and Rose initially did not have a sense of the full learning journey to engage them with the early learning activities in the element. This seemed especially important for Mark who felt that they would be covering old ground and that he would not be learning anything new. He needed a clearer understanding of the learning journey ahead including the goals of the learning element. He also needed to be able to link individual learning activities to these goals expressing frustration when he did not understand the overall purpose of learning activities. For Mark understanding the relevance of learning activities was important to his engagement with these activities.

At a more detailed design level comparing two learning activities involving Analysing Critically, we find that subtle design differences can impact on learning outcomes. The following extracts are from learning elements A and B, and both describe class debates. Prior to the debate in learning element A, the teachers read an excerpt from a book on conservation.

Extract 1:

The debate will have two teams and each team has to defend its plans for the land.
One team is the Farmers – the other team is the Developers. Think about how you would respond to these questions:
Why do you need the land? What will the other team do to the land and surrounding areas? What will affect you, your lifestyle, job, or home?
Write your own ideas down and Rally Robin to share ideas with your small group. Be prepared to think on your feet as well. Come together as a class and start the debate (Learning element A, 2007, p.15).

Prior to the debate in learning element B, the teachers taught the students the structure of a debate.

Extract 2:
In groups, your role is to participate in a debate. Your topic is “Is the traditional purpose and meaning of the Cinderella story lost when it has been written in a modern version?” (Learning element B, 2007, p.13)

The students in research cohort A were allocated a role as a farmer or a developer, and were then provided with some explicit guiding questions to think about from the perspective of their allocated role. The students’ comments revealed that they enjoyed the debate and that it helped them later with their exposition writing but most importantly they showed that the students were actively engaged in the knowledge process of Analysing Critically examining different viewpoints and refining their own understandings:

Extract 1:
I enjoyed the debates we had and I learnt heaps when I got to hear the different points of view. I got put on a side I didn’t agree with but people made good points and I could understand their point of view and I learnt more.

Extract 2:
The debate was effective because it showed me that both farms and building sites both pollute the water. Building sites cause more damage but farms use fertilizers.

Extract 3:
It was effective because we found that both the farmers and builders pollute the water.

Extract 4:
The debate helped me write the exposition to give me other ideas and ideas about what the other class thought about. We were learning from each other. It is like tennis they give us an idea and then we give them an idea.

Extract 5:
I think the debate was very effective. It showed how the class worked together practically in unison. I think our team listened to the other team’s perspective and thought of ways to refute them. The ideas were clear from both teams. I spoke about a starting topic. I think I listened well to everyone’s point of view and if they were in my team I would try and think of a point to back the person up.

Extract 6:
The debate helped me because hearing all the ideas that were said made the writing easier.

Extract 7:
The debate helped me choose which side to vote for. It helped me get different ideas.

Extract 8:
It helped me very much because I had used simple ideas to write a paragraph on each of them. I felt that the exposition was very, very easy to write because of the debate.

Initially, many of the students thought that it would be easier to argue from the farmer’s perspective but by the end of the debate they had discovered that the problem is more complex and that all human activities can impact on the environment. The process of reflecting on the teachers’ explicit guiding questions, taking a position in the argument and then reflecting on the opinions of others and evaluating these perspectives supported the students to think more deeply about the issue.

The students in research cohort B were fascinated with the traditional Cinderella tale recalling many details from the story demonstrating their engagement with the topic; however, the students were not necessarily engaged with the intended learning. Of the students in research cohort B only one of the students moved beyond the surface features of the story commenting:
One of the main reasons I think this story was written, to show people to respect other people and not always get what you want.

The students appeared to need more scaffolding to support them to critically analyse the text and to identify its purpose and deeper meaning. By explicitly guiding their thinking processes, the students could be supported to transform their existing understandings and to think more deeply about the topic.

It would seem that strategies such as the big book versions of learning elements pioneered by Ms Able in her earlier work with middle school students that share the learning design and its goals with the students may be effective in generating a shared class passion for the learning. Such a strategy provides a map for students of the learning journey ahead as well as providing a record of the journey travelled at the end of the learning element. With a stronger sense of purpose students appear more willing to tolerate more mundane activities when they understand how these activities fit into the overall learning plan. For example, some of the students working on the environmental education learning element commented on how they didn’t enjoy recording the data, however, they understood that they needed this evidence to help them solve the environmental mystery. Interestingly, in the data from the junior school learning element a clear articulation of goals and expectations was evident in ninety-three percent of the learning activities contained in the learning element. This may reflect a perception that younger students require more guidance than older students so for the younger students there is greater reinforcement of goals and expectations.

It would seem that systems of belonging such as those harnessed by contemporary workplaces and evident in the affinity spaces of virtual environments also have currency in contemporary classrooms. The presence of clear learning goals and expectations especially goals that unify learning activities into a meaningful whole seem to enhance student engagement with the learning. This can also support the shift evident in contemporary workplaces of accountability from the managers to workers or in the context of classrooms from teachers to students with students taking greater responsibility for the achievement of goals as they begin to understand the overall purpose of the learning. Accompanying this shift in accountability is a shift in ownership of the learning from the teacher to the students.
5.3.2 Personal Connection

In the creation of a shared class passion and commitment to the learning project of the day working within the existing institutional structures of classes formed on the basis of age rather than interest, it is important to explore another element of the learning design. This element is personal connection to the learning. In the context of new learning as defined by Kalantzis and Cope (2005), this is one of the most important elements in creating the key conditions of learning, belonging and transformation. This emphasis on personal connection to the learning is mirrored in Lingard’s (2007) concerns in his work with the Queensland School Reform Longitudinal Study. Data from classroom observations revealed that the learning was often disconnected from students’ lives and from the communities in which they lived. Further, in Frydenberg, Ainley and Russell’s (2005) examination of student engagement they found that there was a weak correlation between student performance and sense of school belonging while there was a strong correlation between student performance and belonging to the learning.

At the same time, concerns have been expressed about how we achieve this personal connection to the learning for diverse learners representing an array of lifeworld differences as well as gross demographic differences. Gaudelli’s (2003) research highlighted the pitfalls of teachers setting themselves up as cultural experts in cultures that are not their own, thus, inadvertently perpetuating cultural stereotypes. Similarly, Cazden (2006) cautioned against assumptions that all learners share an interest and knowledge of popular culture and its products. In Darling-Hammond’s (2006) arguments for all students to have access to a challenging curriculum, there is a clue that the answer to this problem may lie in the learning design.

In examining the learning elements in this study, an interesting feature was noted in the design of two of the learning elements. In these designs, the teachers linked many of the learning activities back to the students’ lifeworlds by building in opportunities for the students to draw on personal knowledge and opinions or to make a personal response to the learning. These activities took on a variety of different forms from structured collaborative activities to personal reflection journals. For example, after a visit to the local pond the students working on learning element A completed the following activity:
Using your ideas and flow chart from the previous discussion, complete a Y chart under these headings:

- Who wins?
- Who loses?
- Who is responsible?

Write a personal reflection in your Values Journal about what you have seen and how we can be more responsible for our waterways and the environment (Learning element A, 2007, p.16).

In exploring how this design feature impacted on the students’ self references to personal connections to the learning, it was discovered that there were more students recording a low level (less than five) of personal connection references in the group where this design feature was less evident:

Table 5.11 Cross-referenced data from learning elements and student responses on personal connection

<table>
<thead>
<tr>
<th>Research Cohort</th>
<th>Learning Element</th>
<th>Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Score</td>
</tr>
<tr>
<td>A</td>
<td>69%</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>6%</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>100%</td>
<td>4</td>
</tr>
</tbody>
</table>

Cross-referencing the data of students in group B with low personal connection references with their performance data provides indications of the potential importance of this design feature to the overall performance of students. Seventy-five percent of the students in this group who recorded a high level of personal connection references also recorded shifts in performance from the beginning of the year to the end of the year while overall in research cohort B fifty percent of students recorded no shift in performance during the year.

Naturally, we would expect more personal connection references from students working on learning designs where this forms an integral part of the design. However, the link between overall student performance and personal connection references was to a degree unexpected. Although all the designs contained some learning activities designed to make personal connections to the learning, particularly in the knowledge process of *Experiencing the Known*, the learning elements where personal connections were woven into most of the learning activities seemed to have the most impact on student learning. In these learning elements although the learning was designed by the teacher for the entire class, the nature of the
activities worked to personalise the learning for each student. This is reflected in the following extracts from students’ learning journal entries:

Extract 1:

I felt disgusted and sad but also in a way I am angry at myself because I know that sometimes I litter too.

Extract 2:

I think we should get rubbish bins all around and if we see rubbish and pollution we should fix it.

Extract 3:

… keep putting buckets in the shower and always do tests on the water to keep us up to date and don’t be building near the area. Now when I go for a shower with buckets I think of our wetlands.

Extract 4:

I felt disappointed at how many things were added to our water before it even reached the ocean. It made me feel very angry at myself and also at everyone else.

Extract 5:

I felt sad because some of what was in the water could of been mine.

Extract 6:

It’s all our fault this is happening. Think about what you’re doing. Put your rubbish in the BIN!

Extract 7:

I felt very sad…we can stop putting rubbish down the drain and stop littering.

These comments were indicative of the group’s sentiments with students articulating how their understandings and actions in using water both at home and at school were impacted upon by their learning experiences.
Similarly, Ms Able reported in her Elearning Symposium presentation (2007) that teachers had observed positive changes in the students’ classroom and playground behaviours as a consequence of the learning element on building friendships. Again, the learning activities across the eight knowledge processes were designed to connect personally to the children and their lifeworld experiences. For example, in the following Conceptualising by Naming activity the teachers linked the learning to the children’s experiences in the playground:

Care, inclusion and consideration? What do they mean?
I am going to give everyone a scale for our fish mural. Have a think about what you did at recess today. Were you friendly towards others? What did you do? Were you including others in your games? Did you care for someone who might have been sad etc? Think of a word which describes what you did at recess. Write this word on your scale and then we will paste it on our ‘Friendship Fish’ (Learning Element C, 2007, p. 14).

The strategy of supporting students to make their own connections to the learning through the design of the learning activities addresses the concerns highlighted by Gaudelli (2003) and Cazden (2006). In this approach, the teacher does not attempt to second guess students’ lifeworld reference points and steps back from the role of cultural authority. In this approach, cultural and lifeworld expertise resides with the students rather than the teachers. The students are active agents in determining the elements of their lifeworld expertise they contribute to the learning situation. The teachers’ responsibility lies in the design of learning elements that facilitate the activation and sharing of this expertise. For example, for the young learners in research cohort C the teacher designed a scaffolded writing activity in which the students identified a personal strength explaining how they show this strength through their actions:

Extract 1:
I can be trusted. I show this by always telling the truth.

Extract 2:
I look after people. I show this by helping them. I help my sister do her homework.

Extract 3:
I am caring. I cuddle my family and friends. I am loving. I look after everything.
Extract 4:
I look after other people. I show this by helping people when they are stuck.

Extract 5:
I help others. I help people when they get hurt. I help my mum and dad go to bed.

Although the teacher provided scaffolds to support their writing efforts, the students were in control of the content choosing their own strengths and examples to illustrate these strengths. In this way, the teacher avoids the pitfalls of perpetuating stereotypical interpretations of diverse cultural groups within the learning community while the student retains control of their expert knowledge making choices about how and when it is deployed in the learning context. Respecting the personal expertise of learners, even very young learners, and recognising their ownership of this knowledge is an important component in establishing a sense of belonging in the learning. Learning becomes a personal and meaningful experience when it recognises the individual identity of the learner and values their unique contributions.

This approach addresses one of the concerns highlighted in the Queensland School Reform Longitudinal Study that “practice was decontextualised” (Lingard; 2007; p.258). In these designs, the learning is continually linked back to the students and their lifeworlds. Although the area of study is not determined by the students but rather falls within departmental curriculum guidelines, the students are personally engaged with the content. Lingard (2007) also expressed concern that the learning was often disconnected from the students’ community. This was not the case with the three learning elements in the research study with all three designs linking to the community in some way. The environmental education learning element made use of a new housing development as a resource for exploring environmental impacts while for the learning element on friendship and social relationships, family members were invited to participate in a play day to teach students games that they played as children. The culminating activity for the fairytale learning element involved working with the junior school community to share the senior students’ stories. In this way, all three learning elements worked to build links with the communities in which the children lived, learnt and played.

5.3.3 Interactivity
A key engaging feature of contemporary social spaces such as Gee’s (2004) affinity spaces is their interactivity. However, the importance of interactivity as a motivating force in human
endeavours is not unique to contemporary contexts. Marx’s theories of human motivation identified the expressive needs of humans as they engaged in work, warning of the alienating effects of “workers merely executing the conceptualisations of others, their employers, foremen and managers” (Carspecken, 2002, pp.63-64). Carspecken (2002) further contends where there is little control over goal oriented tasks, individuals will seek opportunities for self expression that in the context of schools can manifest themselves as disruptive behaviours resulting from alienation and disengagement from the learning.

The value of interactivity in new learning contexts is evident in the work of Gee (2006) on computer games who contested that “all deep learning involves learner’s feeling a strong sense of ownership and agency, as well as the ability to produce and not just passively consume knowledge” (pp.10-11). This is corroborated by Burbules (2004) who highlighted the role of interactivity in creating immersive experiences, experiences that provide “us with opportunities to participate in it, not only perceptually or intellectually but also through embodied action and responses” (p.167). Understanding the nature and extent of extent of interactivity in learning contexts is important as for Carspecken (2002), Gee (2006) and Burbules (2004), it would seem that an absence of interactivity would indicate an absence of one of the key conditions of learning, belonging, as identified by Kalantzis and Cope (2005).

By examining the data on interactivity from the learning elements (section 5.2.1) along with the student response data for this feature from their learning journals and conversations (section 5.2.2), it was possible to build a picture of interactivity in the three different research settings.

<table>
<thead>
<tr>
<th>Research Cohort</th>
<th>Learning Element</th>
<th>Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Score</td>
</tr>
<tr>
<td>A</td>
<td>92%</td>
<td>9</td>
</tr>
<tr>
<td>B</td>
<td>70%</td>
<td>7</td>
</tr>
<tr>
<td>C</td>
<td>100%</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5.12 Cross-referenced data from learning elements and student responses on interactivity
The learning elements provided valuable information on the teachers’ intent in their designs. Overall, the designs tended to favour interactive learning with the activities designed to support active participation in the learning. This would indicate that the teachers using the *Learning by Design* framework largely viewed the acquisition of knowledge as an active process rather than as a passive receptive activity. When cross-referenced with the knowledge process data, one exception was noted in learning element B with only twenty percent of activities in the *Experiencing the New* knowledge process involving interactivity. Looking at examples from the three different learning elements under this knowledge process some design differences in the construction of these activities was evident:

Learning element A:
Set up the experiment from the internet site… ‘A Day in the Life of Urban Creek.’
Choose a character and a related pollutant. Listen to the scenario and add your pollutant to the ‘catchment’ *(Learning element A, 2007, p.14).*

Learning element B:

Learning element C:
Using the big book “The Rainbow Fish,” conduct a detailed book orientation. Peruse the text focussing on the pictures only. Look at the characters expressions, body language etc. Ask the students ‘What is happening?’ Predict the outcome.

Read the story through. Children act as text participants and partake in a personal response to the story. Students write, draw, create a model or make up a play responding to the friendship issues raised in the story.
Collate these responses and produce a multi media class mind map replacing the role play activities etc with photos for the display *(Learning element C, 2007, pp.9-10).*

All three activities involved the students in sitting and listening for at least a part of the activity. However, in learning elements A and C, from the start the students were drawn into story through some sort of personal involvement, creating an interest in the outcome of the story. The responses from the students were what the teachers would have intended with the students in research cohort C participating enthusiastically in the role plays while the students
in research cohort A reacted with strong emotional responses demonstrating their engagement with the story:

Extract 1:

Well, I just saw a disgusting and disappointing experiment. We put all these chemicals in water that is how the water for the creek is going to look in the future.

Extract 2:

I saw all this gross stuff. It was just bad, wrong, disgusting, horrible. We cannot swim in it. I would not want to anyway. I feel sorry for our fish.

Extract 3:

I just saw what I don’t want to see again. It was disgusting and it has a bad odour. I think that was a dreadful sight and if anyone saw that or drank that they could or would die or faint.

The responses from the students in research cohort B were mixed with some of the students enjoying listening to the story with its gruesome details expressing interest in the different versions of fairytales while others expressed a dislike of shared reading:

Extract 1:

I like to read myself. I like to listen, too but I don’t like shared reading because you have to sit there for half an hour and you get pins and needles.

Extract 2:

The worst thing is having to listen to them because some fairytales are really long…it goes for so long and we have to keep stopping because people are talking.

Extract 3:

I prefer reading books by myself… I like to read in my head and choose my own stories.

Some students did not feel the need for an interactive component to the activity finding the content sufficiently engaging to maintain their attention. However, others found it more difficult to maintain their attention throughout the story. Interestingly, with another activity that involved the students in research cohort B listening to a story but that required them to
draw pictures the teachers noted how engaged the students were during the activity with the students themselves commenting:

Extract 1:
My favourite thing was listening to the story and drawing the scene that you heard.

Extract 2:
My favourite activity is illustrating. We did a story yesterday and the teachers read it and we had to draw a picture.

Extract 3:
The best thing is getting to illustrate things cause I like to draw things and learning how to draw.

Extract 4:
I think that the illustrating was fun because I like to draw. I enjoyed it and I hope we can do it again! I drew a frog on a stick and I also drew a pig on a windowsill. I hope we do the illustrating task again.

Extract 5:
I think that illustrating was the most fun in this unit of work because I like drawing and copying pictures, though I don’t really like free drawing because drawing from scratch is really pressuring somehow, but I don’t really know why.

Extract 6:
In the illustrating task we read a story about a princess that was selfish. She had to find people that would hide. If she did not find him they would be married…I did a bit where a young son got turned into a hamster and hid in the princess’ hair! I loved doing this task. I hope to do it again.

Introducing this interactive element to the learning activity appeared to make a difference to the students’ engagement with the story. This prompted an investigation into the types of learning activities students found engaging. Examining the response data from three research cohorts, a picture emerges of the students’ learning preferences:
Extract 1:

We went down to the pond and we drew pictures and wrote about how we felt. It was a good idea because we only have pictures here but there we can actually look at what we are doing to our water.

Extract 2:

I definitely now have a much better understanding of catchments and stuff. I liked the activities where the kids were involved and argued about what we stand for and we could learn from other people’s ideas.

Extract 3:

On this one you got to say what you thought rather than doing it as a whole class. And you got to see what the temperature would be. I like one’s where you get to express your own opinion.

Extract 4:

My favourite part was making the accusation. I liked making my own decision and deciding who the villain was.

Extract 5:

I liked doing the accusation because I got to express my opinions.

Extract 6:

My favourite things were probably polluting the water in the bucket because it was fun and going to the pond.

Extract 7:

I like how we didn’t just discuss it in class but we went out and saw the land clearing near the pond. You did how you feel, what you see and what you hear, and you had to pick the victims and villains. We saw them working so you could see how it affected the groundwater.

Extract 8:
Writing stories is my favourite. I like creating different characters and making up different problems for them.

Extract 9:
There are more and more fairytales we haven’t heard before. I like writing my own stories, too. I write about princesses, dragons and magical creatures – I listen to the words and characters and mix it up a bit.

Extract 10:
The best thing was making our news project. It’s fun doing all the news type stuff and acting like a reporter and putting in all the fairytale stuff.

Extract 11:
The best was probably doing the project where we did our own complete fairytale with a book and everything called ‘Dragon and the Witch’ because we got to put anything we want it.

Extract 12:
I think writings really fun. I like writing my own stories.

Extract 13:
One of my favourite things is writing cause I’ve had a lot of practice.

Extract 14:
I like writing in my journal because it’s good to practice writing.

Regardless of the age of the students, there was a strong sense of the importance of active participation in the learning process both through intellectual and creative endeavours involving problem solving and decision making as well as through embodied activities such as collecting data and role playing. The students wanted to be actively involved as producers of knowledge and knowledge products not just as passive recipients of others endeavours. In many ways, the students’ comments reflect the expressive desire described by Carspecken (2002) with the students asserting their ownership of the learning through their interactions and creative endeavours. The students’ preferences for activities where they felt a sense of agency and ownership, an essential element of deep learning as defined by Gee (2006),
demonstrate the importance of interactivity to student engagement with the learning. Belonging is achieved through the students’ ownership of the learning. Through these interactive experiences the students can influence their learning, make personal connections to learning and evaluate the significance of the learning in the context of their lifeworld experiences.

In examining the learning designs in the research study, we can see that it is possible to create a shared class passion for learning within existing school structures and curriculum guidelines. This can be achieved by using similar strategies to those developed by contemporary workplaces to create new systems of belonging for the generation of motivation and productivity that can operate in both real and virtual environments (Cope et al 1997, Alvesson 2001, Kolehmainen 2004, Kalantzis & Cope 2005). These systems like the learning elements involve a clear communication of goals and expectations as well as the creation of a personal commitment to the work.

5.4 Shared Knowledge

The contemporary knowledge environment is marked by the intensification and complexity of knowledge flows made possible by advances in information communication technologies. It is an environment characterised by rapid flows of information across national boundaries and time zones where knowledge is increasingly shared and shareable (Castells 1997, Heiskanen 2004). In this environment knowledge is fluid, it “does not exist in a vacuum as something fixed and packaged, ready to be sold and distributed” (Alvesson, 2001, p.872). Existing knowledge products are appropriated and innovated upon and new knowledge products are created (Featherstone 2004, Gee 2004). It is also characterised by increased knowledge sharing as people work with and build on other’s creative capital.

In many ways, it is a contradictory environment with both Castells (1997) and Heiskanen (2004) describing an environment of increased individualisation in the workforce with a reduction in employee company loyalty and a greater emphasis on personal careers while at the same time there is a drive for greater collaboration in the workplace (Kuusinen 2004, Monalisa et al. 2008, Woiceshyn & Falkenberg 2008). This drive for collaboration is partly fuelled by what Alvesson (2001) describes as a key characteristic of knowledge workplaces, the capacity to develop innovative and creative solutions to complex problems. This is something that Warner (2006) argues is lacking in the current culture of our schools. Adding to this argument is Darling-Hammond’s (2006) contention that “no society in a knowledge-
based world can long prosper without supporting a thinking education for all its people” (p.15).

5.4.1 Knowledge Sharing and Collaboration

Drawing on the data from the research study, it is possible to explore whether the learning in classrooms using the Learning by Design framework reflects the changed knowledge environment providing a thinking curriculum for all students or whether they are open to the criticism presented by Warner (2006). Since collaboration is a significant feature of complex knowledge environments including contemporary knowledge-based workplaces, it is important to examine the level of knowledge sharing and collaborative activities in the learning designs as well as the level of positive responses to these activities:

Table 5.13 Cross-referenced data from learning elements and student responses on knowledge sharing and collaboration

<table>
<thead>
<tr>
<th>Research Cohort</th>
<th>Learning Element</th>
<th>Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Score</td>
<td>High Score</td>
</tr>
<tr>
<td>A</td>
<td>44%</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>55%</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>100%</td>
<td>0</td>
</tr>
</tbody>
</table>

From the table above, it is evident that all the learning elements featured knowledge sharing and collaborative activities as a part of the learning design with the junior school children engaging in the most knowledge sharing and collaborative activities. Interestingly, although the percentage of knowledge sharing and collaborative activities in the learning element was lower in learning element A than in learning elements B and C, the median for positive responses from students was significantly higher. This unexpected result prompted further investigation. Therefore, to develop a fuller understanding of knowledge sharing and collaborative activities in these classes it was necessary to examine the learning elements and student responses in more detail.

The following extracts from students in Group A builds a richer picture of these students’ experiences with knowledge sharing and collaborative activities:

Extract 1:
We learnt to assess ourselves when we did the talk. We had to look at our role, did our team work well and what we did right and wrong, and then we had to give ourselves a rating. We talked a bit but we got the work done.

Extract 2:
Most of the time people give me a chance. We get along, listen to each other. We are all friends. I play with them sometimes but mostly I play with other people. When we do group work everyone puts in their effort and helps. I like to work in groups because I get more points and ideas.

Extract 3:
I liked working with my table. We worked really good. We seemed to work good with our friendship group. Sam’s got the brains and he has good writing, and me and Ray know a lot about nature and we have lots of good ideas. Ray and Sam normally fight but when we’re working we just get on with it. We normally work nice in a group and we have fun. In some activities, we fight and we don’t use the ideas other people have but we realised that if we keep fighting and stuff we won’t get the work done so we started sharing out the work and working on stuff.

Extract 4:
I’d rather work in groups because you get to talk and information that you miss they’ve got so everyone’s work is better. Sometimes, it’s best to work on your own and if you always work with friends you won’t make new ones and sometimes in your life you won’t get to work with your friends so its good to be ready for that.

Extract 5:
Even though I talk a lot, I learn better when I am working with my friends.

These students highlighted both the benefits and challenges of knowledge sharing and collaborative activities. From these students’ comments, it appeared that the benefits outweighed the challenges and there was a sense that they were gradually building their group work skills. However, this did not occur spontaneously but rather was the result of the teachers’ deliberate design. In examining the learning element, it was found that running concurrently with the environmental education component of the design was a series of activities focussing on the development of collaborative social skills with an emphasis on
personal responsibility. This ultimately culminated in a learning activity that drew together the threads of both the environmental education component and the social skills component applying the concept of personal responsibility to good environmental citizenship. As a part of the social skills component, the students developed social skills rubrics to assist with their evaluation of group performance and completed personal reflections in their journals. The emphasis was on encouraging students to reflect on their own skills and to analyse how they could further improve their group’s effectiveness in completing shared activities. The following are some examples of their evaluations of their group’s performance:

Extract 1:
I think we did work well because we all listened and let each other have a go. We wrote really good things… I will try to be nice and keep everyone quiet and help everyone when they need help but still be nice. I will try less talk and more work for everyone’s sake. We are a great table group.

Extract 2:
In my opinion my team worked well, even if we disagreed about some things. We just put our ideas together and came up with a solution that we were all happy with. If I had to give my group a rating I would mark us 4/5 because we disagreed with a few things but we always came out with a suitable outcome.

Extract 3:
My opinion was that my team worked calm and cooperative. We made the best team…My role was having good ideas and sharing it.

Extract 4:
I thought they were great but sometimes there would be a bit of impatient talk… I will be helpful and nice. I won’t hold back my ideas and I will try not to take control of everything.

Extract 5:
I think my group worked very well. Everyone took turns and had fun.
Extract 6:

I think my team worked well even though we disagreed with each other a few times. We got to the end but everything worked out….I would give my group a rating of 4/5 because my group worked really well but still not absolute perfection. It was very fun to do with my group…I would work cooperatively and very hard for my group to succeed. I would be responsible for this and so would the others because we’re a team not independent.

These examples were a window into the students’ transformation revealing their developing skills and understandings about collaborative group work demonstrating the efficacy of the learning design. These students were learning the social skills necessary to work effectively with different people, to respect their expertise and perspectives, and to value their contributions as well as to feel comfortable in sharing their own emerging ideas. They had also come to the realisation that through collaboration they could achieve more than they could alone.

In contrast, the students in research cohort B were more ambivalent about knowledge sharing and collaborative group work as indicated by the statements below:

Extract 1:

Mostly by myself but I will work with a partner. I work better by myself. I don’t have to wait for someone else so I get it done quickly. Sometimes if I get stuck on something I ask the person next to me and then we’ll ask if we can work together.

Extract 2:

I like working with a partner and by myself because during group work normally no one listens. With a partner it is easier and by yourself – you just have the freedom to go at your own pace.

Extract 3:
I like experiencing things by myself but I also like to learn things from other people and the people are there to help you if you struggle. I think they should use groups more often than they do.

Extract 4:
I like to work in a group because then you get other people’s opinions and if you’re stuck they can help you or if they’re stuck you can help them so it’s better. I usually work with my friends if we’re allowed to move desks.

Extract 5:
We had to go on the internet and research the answers on Cinderella but I didn’t finish because I couldn’t find the answers. I could have worked with a partner but I worked by myself. I enjoy working with someone else but everyone else already had a partner. I think it’s easier because one can be answering one question and the other another and the we can put them together.

Extract 6:
We usually work with our shoulder partners or by ourself but sometimes we’ve got to do our own work. It depends who I work with whether I like working by myself or with others.

Extract 7:
Sometimes we work with our face partners or shoulder partners. I like working by myself because I get it done quicker. Talking and helping others stops me from getting it done fast.

Extract 8:
It’s easier if you’re doing it by yourself because no one would bother you but if you’re doing it with a partner you can talk to them and they can help you.

This difference in attitude was curious as the students in research cohort B participated in more knowledge sharing and collaborative activities overall than the students in research cohort A. Upon close examination of the students’ comments as well as the learning designs, a possible explanation became evident. Although the students in research cohort B had opportunities to work with partners and small groups, the design of learning element B did not include a social skills component for the development of collaborative work skills or
formal structures to support collaborative activities including some form of accountability mechanism for students. In contrast, the jigsaw activities in learning element A were designed in such a way as to promote accountability for learning with group members initially divided into expert groups to learn about an environmental issue and then returning to their work group to share their expertise. The expert knowledge of group members was highly prized with the combined expertise of all group members contributing to the group’s successful completion of subsequent learning activities. This created a sense of personal accountability for developing and effectively sharing new expert knowledge. The students were also required to evaluate their group’s effectiveness in completing collaborative activities.

Such structures with their accompanying social skills development emphasis embedded within the learning design may have improved the experiences of students in research cohort B during collaborative group work. From the students’ comments, it was apparent that it could not be assumed that they possessed the skills for effective collaboration and knowledge sharing but rather needed to be taught these skills. This is contrary to Tapscott’s (1999) contention that digital age students through their online interactions are “learning precisely the social skills required for effective interaction in the digital economy” (p.8). The deliberate design of collaborative learning activities with a supportive structure and social skills component can more effectively ensure that all students have the necessary social skills to participate fully in collaborative work situations and to feel a sense of belonging in the learning. Woiceshyn and Falkenberg (2008) contend that these sorts of supportive structures are also features of successful contemporary knowledge-based workplaces:

For example, Google would not be as successful at problem solving if it merely recruited a cadre of talented people and left them to their own devices, without the explicit corporate value of knowledge sharing, active nurturing of network resources, and supportive managerial and technical systems the company has established (p.92).

Knowledge sharing and collaboration are particularly important in complex and intense knowledge environments where success depends on the creativity, innovation and problem solving capacity of team members. The nature of the knowledge processes in the Learning by Design framework support this type of activity as students are encouraged to work with knowledge, to make links, to challenge it, to innovate on it and to create new knowledge. These intense thinking processes are easier in collaborative contexts with diverse opinions.
and instant feedback on ideas. For Warner (2006), this capacity for innovation, creativity and problem solving should be a feature of the current culture of our schools.

For the junior students in the research project, the learning of these skills began at a very early stage in their school careers at the age of five and six years old. Through a specially designed learning element these young students were learning to play and work together harmoniously. They were learning to evaluate their social skills and to make conscious decisions about their actions. Like the senior students in research cohort A, they evaluated their own collaborative skills using a simplified rubric with pictorial responses. In watching the students prepare for a school assembly presentation, a casual observer may have marvelled at the level of participation and cooperation as the students worked collaboratively to create a dance to accompany their song. To the more informed observer, it was evidence of the effectiveness of the learning design taught during the first school semester. After the completion of this learning element, the classroom teacher also reported a drop in negative playground behaviours with fewer referrals of students to the rethink room by teachers on playground duty.

By working collaboratively, the students learn to value diverse opinions and expertise as highlighted by these experienced collaborators:

Extract 1:
I learnt that you don’t always need to work with friends to produce your best work.

Extract 2:
I like working with groups – if you only have pairs you don’t get so many ideas but with other people you learn lots of things and they don’t always have to be friends because other people have different ideas and you can put your ideas together and you learn lots of things.

Extract 3:
I learnt that working with your friends is great but working with others is important too. Working with others you can make new friends and learn more about each other.

Extract 4:
Everyone shared their ideas and statements. If someone said an idea and it didn’t make sense, we all helped so it did make sense.

Extract 5:

It was interesting to hear everyone’s point of view and what they wanted to say… I think I raved on a bit but it felt great to get all of those ideas out of my system.

The importance of knowledge sharing and collaborative group work is highlighted when cross-referenced with data on the deployment of these activities within the knowledge processes. Across the three learning elements, these knowledge sharing and collaborative activities are used most often in the knowledge processes of Conceptualising by Theorising, Analysing Functionally and Analysing Critically. These can be considered to be particularly intellectually demanding knowledge processes where students benefit from the opportunity to engage in challenging discussions that provide differing perspectives on issues and feedback on ideas thereby developing a deeper knowledge of the subject area.

Knowledge sharing and collaboration is also important in contemporary workplaces as it allows colleagues to provide valuable input into the work in progress and to make links with their own work. The nature of this type of first draft knowledge sharing and collaboration in contemporary workplace teams needs to be emulated in educational settings for as argued by Kuusinen (2004) “if one’s own understandings and the special features of one’s individual knowledge construction have not been appreciated in one’s school education, one probably learns to keep quiet about them” (pp.72-73). This important element of belonging in one’s learning where emerging understandings and ideas are treated with respect is particularly important in the context of preparing learners for workplace teams where workers are located in cities across the globe and rely heavily on electronic written forms of communication. With positive educational experiences of knowledge sharing and collaboration, workers may become more willing to engage in the sharing of written drafts in on-line environments.

5.4.2 Intellectual Challenge

The importance of a challenging intellectual environment for students features significantly in the work of many theorists including Darling-Hammond (2006), Gee (2006), Lingard (2007) and Ritchhart (2007). Darling-Hammond (2006) contends that the lack of a challenging curriculum impacts more on student achievement than their initial ability levels. This is
corroborated by Lingard’s (2007) article on the Queensland School Reform Longitudinal Study that argues that a more socially just education demands a more equitable distribution of cultural capital through intellectually challenging pedagogies for all students noting that less intellectually challenging pedagogies were often observed in schools serving disadvantaged communities. Possible reasons for this phenomena included accountability regimes that focussed on basic skills as well as a crowded curriculum that drove teachers to focus on covering the content rather on the development of intellectual skills such as high order thinking. Unsurprisingly, just like in contemporary knowledge workplaces the emphasis tends to fall on the knowledge that is valued by the organisation (Woiceshyn & Falkenberg, 2008). In education systems with accountability regimes focussed on basic skills, the clear message is that this is the knowledge that is valued by the organisation rather than innovation, creativity and problem solving as advocated by Warner (2006). This lack of emphasis on a challenging curriculum and pedagogies is of concern both for the reason cited by Darling-Hammond (2006) in that it impacts on students’ achievement levels but also because it has implications for their future employability in contemporary knowledge based workplaces. Alvesson (2001) contends that in contemporary knowledge workplaces pure intellectual skills as well as social skills are often equally or more prized than a body of knowledge associated with a particular discipline.

The link between performance and intellectual challenge was also evident in the Students Learning by Design study. When the students’ performance data was cross-referenced with their response data from learning journals and conversations, it was found that in both senior research cohorts, 62.5% students whose shifts in performance scores were at or above the cohort median also recorded at or above the median for references to the intellectual challenge of the learning program. In examining this data more closely it was discovered that in the combined data for research cohort A and B, sixty percent of the students considered to be the lowest performers at the beginning of the year performing at an assisted competence level in at least four knowledge processes were also among the 62.5% that recorded at or above the median for shifts in performance and recorded at or above the median for references to intellectual challenge. This would tend to support Darling-Hammond’s (2006) assertions about the importance of an intellectually challenging curriculum to student performance.

A possible explanation for this enhanced performance is greater student engagement with the learning program. From the perspective of the students themselves and their educational experiences, Frydenberg, Ainley and Russell (2005) in their examination of research into
student engagement found that there was substantial research as well as information from classroom practice to indicate that in general students are more likely to engage with tasks that are challenging. Gee’s work on computer games supports this contention with Gee (2006) arguing that good games were “pleasantly frustrating” creating an effective learning environment. The term “pleasantly frustrating” could be applied to the sentiments of Trent and Marie, two of the students in the Students Learning by Design study that were in the sixty percent of students who were considered to be under-performing at the beginning of the year but who recorded at or above the median shifts in performance as well as at or above the median references to the intellectual challenge of the learning program. The following extracts describe how they felt about the environmental education learning element:

I feel it’s a great program and that the work before helped me with solving the mystery. I can’t get to sleep at night because our class have narrowed it down to a few things. I can’t wait until we find out.

I feel like I have learnt everything in this world because we have learnt about villains and victims. I feel like I have gone into a scientist’s head and have learnt how to use water samples. I am like Ms Sure because I stayed up all night and got clues and put them together as a plan. I feel so lucky that we are learning about this in such a short time it is so fun.

Within this learning element knowledge is presented as problematic with differing stakeholders presenting different perspectives on the information. The students then needed to apply their new and emerging understandings to a rich, complex problem with a “pleasantly frustrating” mystery to solve. Acquiring knowledge became more purposeful and engaging for as described by another student in this research cohort, Julia, “it was interesting because you get this huge idea but then you had to learn about something else but you still needed that information because it was important so it wasn’t a straight line.” In Ritchhart’s (2007) terms the students were engaging in rich thinking:

A quality curriculum asks more of students than just memorisation and replication. Students must make connections, observe closely, ask questions, form conjectures, identify points of view, consider alternatives, evaluate outcomes, make evidence-based judgements, and so on (p.41).
For Ritchhart, the emphasis in designing activities for students should be on the types of thinking students will be involved in during the activity. This is consistent with the *Learning by Design* framework with its eight knowledge processes that guide teachers to consider the thought processes involved in the activities in their learning elements to create a challenging learning program.

Interestingly, when analysing the students’ responses to knowledge sharing and collaboration it was discovered that the nature of the activity and the level of intellectual challenge impacted on the students’ attitudes to collaboration.

Extract 1:

I liked the jigsaw activity - each group learns about a different activity and I was learning about sediment and silt and then you go back to your table and you share your ideas. You mainly learn about one thing but then you go off and you can learn more, more quickly… I enjoyed the debates we had and I learnt heaps when I got to hear the different points of view. I got put on a side I didn’t agree with but people made good points and I could understand their point of view and I learnt more…I probably liked it with friends and stuff and a mixture of classes because you get to work in different areas and hear different opinions and I don’t think I would have been able to work it out if I was just by myself.

Extract 2:

I like working with groups – if you only have pairs you don’t get so many ideas but with other people you learn lots of things and they don’t always have to be friends because other people have different ideas and you can put your ideas together and you learn lots of things.

Extract 3:

We had to think about what we learnt from activities….The debate helped me write the exposition – to give me other ideas and ideas about what the other class thought about. We were learning from each other. It is like tennis – they give us an idea and then we give them an idea….In the jigsaw activity, we learnt about things and then shared them with the class. I learnt that manmade things like fertilisers are bad for environments. Each learns a bit then we could come together to understand what it is and write it down so we could understand it for the mystery so the jigsaw helped me.
Extract 4:

I liked it because you got to look at the environment and the hazards. My favourite part was making the accusation. I liked working in groups and looking at others opinions and their reasons and you got to make suggestions like you could look at this….I liked the jigsaw activity because you get to see different teachers points of view – sometimes they had very different points of view.

Extract 5:

If I don’t know much about something it’s good to work in a group so we can discuss it and work it out but if it’s something easy I prefer to work by myself.

Extract 6:

It depends on what the activity is, if it’s a hard one it’s better in a group so we can help each other but if it’s an easy one it’s better to do it by myself.

Extract 7:

We liked to work in our group – when me and my friends work in a group, we hear each others ideas and get lots of ideas. We work well because we play with each other so we know each other well and we measure up to each others strengths.

In the extracts, the students made links with the challenging nature of the knowledge work involved in the learning activities and the knowledge complexity and intensity of tasks that made working together beneficial. Some expressed the opinion that when the work is easier they prefer to work alone and do not see the need for collaboration. All the comments made some reference to knowledge complexity and intensity, and how collaboration either helped them to complete the work, solve a problem, improve their performance or to learn more and in some cases faster. The students’ comments would indicate that knowledge sharing and collaborative activities become more purposeful if they are challenging. This reflects the world of contemporary knowledge-based workplaces where experts are drawn together from across the globe to work on challenging problem solving activities requiring diverse expertise and deep knowledge of a range of cross disciplinary areas with more routine tasks being performed individually (Monalisa et al, 2008).
5.4.3 Shared Language

Brown (2006) in his exploration of how learning could be better designed to meet the needs of 21st century learners argues that students should be enculturated into knowledge communities to learn, think and operate as members of these knowledge communities. By engaging with practicing members of specific knowledge communities such as scientists or authors, the learning becomes more connected to the ‘real world’. The importance of this real world connection is highlighted in the Queensland School Reform Longitudinal Study (Lingard, 2007) as well as in Ritchhart’s article on quality curriculum. It also featured in Frydenberg, Ainley and Russell’s (2005) research on student engagement with students favouring activities that were linked to real life contexts.

An important part of this enculturation process is learning to appropriately use the language of the knowledge community to develop situated meanings through dialogue or substantive conversation (Education Queensland, 2001; Gee, 2006; Morrow and Torres, 2002). When students are given opportunities to use the language of the knowledge domain they are effectively becoming members of that knowledge community developing a shared language for communication that encapsulates the ways of knowing of that community. This enables them to participate meaningfully in discussions about issues within this knowledge domain and to use this language to engage in complex thought processes including problem solving. The following extracts from students working on the environmental education learning element highlight the students’ perspectives on the importance of language and provide an example of a student effectively using this language to explain his experiences on a wetlands excursion where students engaged with experts on water quality:

Extract 1:

I knew a bit already but not as much as I know now. I know all the words for it now like catchment area, salinity, sediment, silt and all the other stuff like land use. The only ones I had heard of before were land use and vegetation. We covered all the definitions first before we moved onto the mystery. We also did a fair bit on the Murray Darling Basin.

Extract 2:
If we hadn’t done all this work before we couldn’t have understood what he was talking about at the wetlands. But now I understood all the words and what he was talking about, about fertilisers and things.

Extract 3:

It was good – we learnt about the silt trap – when a river’s coming in the water starts to slow and pushes to the side. I learnt that the water that looked dirty was actually low in turbidity and the temperature was good. The animals we found in there pointed to the fact that it was good water because they don’t like turbidity. We found tadpoles and frogs. I’d learnt things over the years but I didn’t know about dredging and how dreadful fertilisers can be because they can ruin, poison the soil that runs into the river and form blue green algae and salvinia. Salvinia is alligator weed, like a lily pad with flat holes in it.

The students felt they were able to communicate on a more equal footing with experts in the field because they possessed the language of that knowledge community. The language had become a part of the students’ repertoire and they were using it to explain their evolving ideas about the environment.

This prompted an investigation into how this shared language was created through the learning design. In analysing the learning elements, cross referencing the knowledge processes with the features of new social spaces, it was discovered that most of this language development occurs in the knowledge process of Conceptualising by Naming as expected but that it also occurs during other knowledge processes with Conceptualising by Theorising also featuring significantly in the aggregated data for the three learning elements. Following through on evidence provided by the students of activities they considered valuable, a slice from learning element A was examined more closely. This included a short sequence of activities that illustrate how the shared language with the concepts they encapsulated was created through the learning design. The jigsaw activities were pivotal in this process with students working in expert groups to develop their understanding of a specific issue and then returning to their home group to share their expertise:

In the jigsaw activity, we learnt about things and then shared them with the class. I learnt that manmade things like fertilisers are bad for environments. Each learns a bit
then we could come together to understand what it is and write it down so we could understand it for the mystery so the jigsaw helped me.

I liked the jigsaw activity - each group learns about a different activity and I was learning about sediment and silt and then you go back to your table and you share your ideas. You mainly learn about one thing but then you go off and you can learn more, more quickly.

The process of expertise sharing involved the students in using the specialist language associated with their environmental issue, explaining the associated concepts and then working together with their group to develop definitions for the new terms introduced. In the following extracts from the students’ learning journals, the students explain what they learnt from these jigsaw activities:

Extract 1:
I learnt that sediment is matter that settles to the bottom of the water or liquid. I also learnt silt is earthy matter carried by moving or running water and deposited as sediment. Another thing is sediment and silt changes depth and flow of water, which affects temperature, and fish have difficulty breathing. Silt destroys fish habitat. Most soils can hold chemicals and heavy metals, bringing them into waterways.

Extract 2:
I learnt that you can redirect a river to make it go faster. I also learnt that if the water is slowed there is less oxygen in the water. Cold water holds more oxygen.

Extract 3:
I learnt that salinity is the amount of salt in rivers, oceans, lakes and rapids. When the groundwater lessens the salt rises to the surface. The salt affects the land at the top and the fresh water.

Extract 4:
I learnt what sediment and silt was. Sediment is the matter that settles to the bottom of the liquid and silt is earthy matter carried by moving or running water. Before the lesson I had no idea what sediment and silt was!
Extract 5:

I learnt that too many nutrients are bad for water.

At the conclusion of this process, the whole class came together to share, discuss and refine their definitions to build a glossary of terms. These words were then reinforced during subsequent activities such as the water review and the effects wheel with the students using these words and concepts in completing these activities. This process involved dialogue and substantive conversation, and was embedded in learning about real environmental issues through experiments, videos and websites (Education Queensland, 2001; Gee, 2006; Morrow and Torres, 2002).

Taking a slice from learning element B, a similar pattern emerges with students engaged in both paired and small group work after initial explicit instruction from their teachers about narrative text structures. The students were provided with opportunities to use their newly acquired specialist language in a series of activities involving text innovations, deconstructions and reconstructions working in their pairs and small groups. As with research cohort A, the students in research cohort B appeared to have incorporated this specialist language into their repertoire using it both in their learning journals and conversations. For example, in this extract from a learning journal the student describes her understanding of the structure of narratives:

I know that most fairy tales start with stuff like once upon a time, long, long ago, a long time a go. I also know that most fairy tales are like narratives because they have the orientation. In the orientation they introduce the characters and describe the characters and then the complication is a situation that changes the normal run of events and then last but not least resolution which solves the problem.

This extract demonstrates her understanding of the specialist language used to explain the features of the narrative genre. The students also understood the types of language commonly found in fairytales as illustrated in these extracts from their learning journals:

Extract 1:

I also know ways to start fairytales. One way could be ‘once upon a time’, ‘long ago’, ‘one summer day’ or ‘one morning’.
Extract 2:
Fairytales are fiction and always start with ‘once upon a time’ and mostly always end with ‘happily ever after’.

Extract 3:
Most fairytales start with ‘once upon a time’ and usually end with ‘they lived happily ever after’. Fairytales are usually magical and mythical with all the wizards, witches, fairies, dwarves, elves, mermaids and everything else.

In learning element C designed for younger students a more formalised pattern of interaction was used called ‘Circle Time’ but which still incorporated both paired and small group discussion using language associated with the qualities of a good friend. The students were engaged in sustained discussion about what a good friend looks like and sounds like, first in pairs and then in fours. In a subsequent activity, the students painted a portrait of their good friend and captioned it with a description of their qualities. The following are some examples of these captions:

Extract 1:
This is my good friend Lisa. She is a very good friend because she always helps me. She is a very kind and considerate girl. She helps everyone!

Extract 2:
This is my good friend Tim. He is a very good friend because he shares and plays with everyone. I like Tim and I often play with him.

Extract 3:
This is my good friend June. She is a good friend because she plays with her friends. June always shares with others.

Again, the students are using the language introduced in the learning element to describe the qualities of a good friend. It is interesting to note that in all three learning elements, over fifty percent of activities involved discussion and dialogue of some kind including paired, small group and whole class discussions as well as debates and presentations. This provided opportunities for the development and use of the language of the knowledge domain such as
the specialist vocabulary and language forms used within the domain to describe, explain and argue.

Examining the student performance data along with their response data from learning journals and conversations, the importance of the conceptualising knowledge processes to learning becomes apparent. In research cohort A, 62.5% students whose shifts in performance scores were at or above the cohort median also recorded at or above the median use of the shared language of the knowledge domain. Importantly, eighty percent of these students were considered to be among the lowest performers at the beginning of the year performing at an assisted competence level in at least four knowledge processes. At the end of the year, they were performing at an autonomous or collaborative competence level across the eight knowledge processes. The data from research cohort B produced comparable results with a hundred percent of students whose shifts in performance scores were at or above the cohort median also recorded at or above the median use of the shared language of the knowledge domain with all the students identified as under-performing within this group. Similarly, the literacy data with a strong language emphasis from research cohort C indicated that research cohort C’s average had shifted from below the general cohort average to significantly above the general cohort average.

This would suggest that the conceptualising knowledge processes and in particular, Conceptualising by Naming, filled a gap for these under-performing students providing them with the language necessary to participate more fully in the learning process. They had become skilled at using the language and concepts of the knowledge domain using the language to learn and to demonstrate learning. Like workers in contemporary knowledge-based workplaces they were able to use this shared language to collaborate with their team members in activities involving creativity, innovation and problem solving (Monalisa et al, 2008; Woiceshyn and Falkenberg, 2008). In Brown’s (2006) terms the students had become enculturated into the knowledge communities enabling them to think and operate as members of these knowledge communities or as Marie expressed it in her learning journal “I feel like I have went into a scientist’s head…”.

The results of the triple lens analysis of the data using the eight knowledge processes from the Learning by Design framework, the six features of new social environments as identified by the research literature, and the student performance measures would indicate that learning designed using the Learning by Design framework overall has a positive impact on student
belonging and transformation. In particular, the greatest transformation was noted among under-performing students although these improvements in performance were not restricted to this group of students. Through the cross-referencing of the data from the teacher designed learning elements and the students’ response data, it is evident that learning elements designed using the *Learning by Design* framework include the six features of new social environments commonly found in new knowledge work places and virtual spaces. This was especially evident in the knowledge intensity and complexity in the learning designs presenting students with an intellectually challenging curriculum. Collaborative and knowledge sharing activities also featured significantly in the learning designs promoting the development of a shared language and concepts associated with the disciplinary focus. Therefore, there appears to be a match between the types of learning occurring in classrooms using the *Learning by Design* framework and the nature of new social and work environments associated with knowledge societies. The following chapter will explore the impact of *Learning by Design* on individual learners in the *Students Learning by Design* study, presenting their personal perspectives on the learning elements.
Chapter 6
Tales of Transformation

This chapter explores the personal learning journeys of the key informants in the Students Learning by Design research study. It examines the impact of the different learning designs on these students’ learning experiences and their performance. Although the stories highlight the individuality of all the students and acknowledge the lifeworld differences they bring to the learning, many of the students across the research sites also shared characteristics that allowed them to be grouped into some broad categories.

6.1 Different Perspectives

Kenway and Bullen (2005) described many of today’s students as having a “5D relationship” with schooling, that they are “dissatisfied, disengaged, disaffected, disrespectful, and disruptive” (p.31). The personal learning stories of the students in the Students Learning by Design study are a window into the learning experiences of students working in classrooms using the Learning by Design planning framework. By looking at their stories, we can examine their relationship to schooling to determine whether it reflects the same disenchantment described by Kenway and Bullen (2005) and that highlighted by Rowe (2003) in his paper on quality teaching, with examples like that of the thirteen year old boy who emphatically declared that he hated school, wanting only to write about things he was interested in like sport and military aircraft.

Importantly, through the stories of the students working in classrooms using Learning by Design, we can explore engagement in Frydenberg, Ainley and Russell’s (2005) terms as energy and action directed towards a learning area. This is significant as in Frydenberg et al’s examination of the research field they found that this type of engagement acted as a strong predictor of success in a given learning area. They maintain, “students will engage with tasks that are interesting, challenging and important” (Frydenberg et al., 2005, p.7). Through the students’ response data in their learning journals and conversations, combined with their performance data, it is possible to explore this link for the students in the research study to determine the impact of belonging in the learning on transformation. In this way, we can
examine how *Learning by Design* influenced the students’ affective responses to the learning as well as their academic performance.

By closely examining the students as learners, it is also possible to identify whether the students within the classrooms in the research study exhibited the characteristics of the past industrial era or whether they were representative of knowledge era students; for example, were the students passive or active, compliant or critical (Kalantzis & Cope, 2005). As argued by Kalantzis and Cope (2005), passive, compliant workers suited the needs of industrial era employers as they needed a workforce that tolerated menial and boring tasks. However, as previously discussed in the literature review, these needs are very different to the needs of knowledge era employers who demand creativity, innovation, complex problem solving ability and the capacity to work effectively in diverse teams across national boundaries (Alvesson 2000, 2001; Kolehmainen, 2004; Heiskanen, 2004; Woiceshyn & Falkenberg, 2008).

Alternately, it is also possible to consider whether *Learning by Design* fulfils the promise of advocates of new learning producing active, critical and thinking learners (Kalantzis & Cope, 2005; Brown, 2006; Darling-Hammond, 2006; Warner, 2006; Lingard, 2007; Martino, 2007; Ritchhart, 2007) or whether it falls into the trap feared by McLaren (2005) and Monahan (2005) of contemporary education cultivating “a flexible and docile work force for low-end service sector jobs in the city” (Monahan, 2005, p. 6). The fear expressed by McLaren and Monahan is not unrecognised by the advocates of new learning who are aware of the importance of the curriculum and pedagogical choices made by teachers in the design and delivery of new learning. The stories of the students in the *Students Learning by Design* study allow us to explore the impact of these choices on the students’ learning experiences and how they interact in the learning environment, and to explore how these experiences may influence their future participation in the workforce.

The following tales of transformation capture the personal learning journeys of some of the students in the *Students Learning by Design* study. In Kalantzis and Cope’s (2005) terms:

> These journeys can be understood as narratives of sorts. They are life narratives of self-transformation and growth…Retrospectively, the learning story runs like this: who the learner was, where they went, the things they encountered, and what, as a
consequence of their learning, they have (knowingly) become. In this story, learning is the key thread in what turns out to be a kind of cultural journey (p.48).

With the exception of the students in their first year of formal schooling, the stories of the student key informants in the study have been categorised into some broad groups based on the students’ previous attitudes and approach to learning as well as their performance. These categories have been labelled ‘critical consumers’, ‘capable operators’, ‘unrewarded workers’ and ‘risk minimisers’, representing to a certain degree the characteristics of the students in these groups while the students in their first year of schooling have been labelled ‘fledgling learners’, reflecting their status as novices in the formal school setting. The critical consumers are generally characterised by their self-confidence and decided opinions on their schooling with a self-recognition that in the past they have not always engaged with the learning or performed at their best because of their lack of interest in the learning. In contrast, the capable operators are highly motivated to succeed in the school setting and engage with the learning even when it does not particularly interest them, generally performing well in measures of school achievement. The unrewarded workers, like the capable operators, are motivated to achieve school success; however, this success in the past has eluded them with their efforts not reflected in performance measures. The risk minimisers are generally capable and cooperative, drawing little attention to themselves in the classroom setting and completing tasks using strategies that have previously proven successful. The final category tells the stories of two young learners just starting out on their school journey and examines their emerging relationships to learning. These are compared and contrasted with the stories of the older learners in the research study speculating on the potential impact of early exposure to learning planned using the Learning by Design framework and its eight knowledge processes.

6.1.1 Critical Consumers

In the Students Learning by Design study, Mark, Trent and Sam represent the ‘Critical Consumers’. These students most closely resemble Rowe’s (2003) disaffected thirteen-year-old boy who hated school and who had very decided ideas about what he wanted to do at school. Although Mark, Trent and Sam did not express a disliking for school they also had clear ideas about their expectations of schooling. These students were decidedly children of the choice generation who are often caught in the clash of cultures between the consumer-media culture of their lifeworlds and the adult-controlled world of traditional schooling (Schilling, 1993; Valentine, 2001; Kenway & Bullen, 2005). These students have a strong need for a sense of agency over their own learning. In Carspecken’s (2002) terms as discussed
in the literature review, these are the students who seek opportunities for self-expression in tasks where opportunities for such expression are limited and where the control over learning is in the hands of teachers. As a result of their willingness and ability to articulate their feelings and expectations about their learning, they can easily fall into the trap of being labelled with Kenway and Bullen’s (2005) ‘5Ds’ with some considering them to be disrespectful or disruptive. In reality, at times they can be considered to be truly dissatisfied, disaffected and disengaged when the learning fails to meet their expectations.

In many ways, these students can be considered to be misunderstood. Mistakenly, their disengagement and dissatisfaction may be attributed to their gender. However, this explanation based on a gross demographic characterisation of disengaged students does not hold true for the critical consumers in the *Students Learning by Design* study with both genders represented in this category among the broader research cohort. This included a group of girls who were less overtly critical of their learning experiences so as not to draw too much attention to their relative disengagement and who on the whole performed well academically. However, as with the boys in the focus group, their performance fluctuated according to their level of engagement. The difference was that this change in performance was subtler and often only evident to the students themselves who admitted that they did not expend the same amount of effort on certain activities because of their own lack of interest. A member this group, Amelia, explained:

I wasn’t as dedicated…I still paid attention…I didn’t want to ruin it for others and talk and stuff.

Amelia further admitted, “I don’t go on my computer and look up the ‘crime sites’ at home because it doesn’t really interest me at all.” This was in contrast to another learning element on which she spent considerable time at home because it was in her area of personal interest. Despite these critical comments, Amelia went on to add:

This was different before it wasn’t that big and it was more about keeping things clean. This one was better because there was more effort. The other one was really small, there wasn’t much there. I learnt more through this one. With the other one, you knew much of the stuff already but this one I hadn’t learnt about all the things before. I was learning about new things.
Amelia recognised she was learning new ideas through this learning element and her performance data indicated that her work in the knowledge processes of *Analysing Critically, Applying Appropriately* and *Applying Creatively* had improved with a shift from the autonomous competence level to a collaborative competence level across these three knowledge processes. However, from Amelia’s personal perspective she felt she did not devote as much time and effort into this learning area as some others. In looking at the following stories of the boys in the critical consumer category many similarities with Amelia will become apparent. For example, like other critical consumers these critical girls seek agency over their own learning and value opportunities for self-expression with Amelia declaring, “I liked the ones where the kids were involved and argue about what they stand for and can learn from other people’s ideas.”

Unfortunately, the more overt patchy or under-performance of some critical consumers can often be mistakenly interpreted as a desire to avoid work or as a general disengagement from learning. However, on the contrary, these students demonstrated themselves to be active, passionate, highly engaged thinkers when pursuing an area of interest marked by improved performance consistent with Frydenberg et al’s (2005) exploration of the research field on student engagement. These students wanted to belong in the learning and for the learning to introduce them to new experiences and ideas that were challenging and important. These students wanted learning to be transformative.

### 6.1.1.1 Mark

Recalling our first encounter with Mark, he was the eleven-year-old passionate scientist and mathematician who considered learning about fairy tales “stupid” and more appropriate for children in kindergarten. Although once he had some experience with the learning element he was more positive and indicated that he had learnt a lot. He was not a work avoider and completed set tasks, identified by his teachers to be working consistently at an autonomous competence level at the beginning of the year. He even pestered his teacher for more challenging work such as algebra that he considered to be so difficult that it was fun. However, his engagement with tasks fluctuated. Consistent with Frydenberg et al’s (2005) findings, Mark would engage with tasks that he found “interesting, challenging and important” (p.7).

When pronouncing his final verdict on the learning element on completion of the program, he stated, “when we did illustrator and story writing that was fun but when we had to spot the
differences and similarities it was completely annoying.” Tracking back to his learning journal entry on the illustrator activity, he provided more clues as to why he enjoyed these particular activities:

I loved the illustrator task. Illustrating it is heaps of fun! Illustrating isn’t just drawing, it is telling the story. The first time I did a frog talking to a frog. The second time I did a picture of a fox taking a prince to a pond to hide from the princess and her twelve magical windows so he would have her hand in marriage.

Cross-referencing Mark’s comments with this section of the learning element, we discovered a sequence of lessons involving the knowledge processes of *Conceptualising by Naming* and *Analysing Functionally*. These learning activities focussed explicitly on the features of illustrations, an analysis of their purpose and importance to the story as well as an examination of the differences between illustrations and drawings. These lessons culminated in the *Applying Appropriately* illustrator activity that Mark highlighted. The design of this sequence of lessons provided him with an understanding of the importance of illustrations in children’s stories and explicitly outlined their features, supporting him in the completion of the task. Through these activities, Mark was developing a sense of audience recognising how both texts and illustrations could be used to communicate with others. The explicit communication of learning goals and an understanding of the overall significance of a learning activity were important in engaging Mark in the learning as demonstrated by his earlier negative response on discovering that they would be learning about fairy tales.

In the culminating activity of this learning sequence he had a clear purpose, he was no longer just drawing a picture to accompany the text but rather he was telling the story through the illustrations. Through his journal entry, Mark demonstrated that he listened closely to the story and that he engaged with the task. Significantly, he explained the function of illustrations noting their important role in telling the story. As a result of this understanding, he was incorporating more detail into his illustrations and he was able to relate back the details in his illustrations to the original story. A further contributing factor to Mark’s enjoyment of the illustrator activity was the opportunity to use a different modality for self-expression other than writing. As we learnt in our first encounter with Mark, he considered himself not to be good at writing, declaring that he was a bad speller and had messy handwriting. Therefore, the opportunity to use a visual medium in a task was particularly appealing.
Despite Mark’s declared concerns about his writing ability, one of the other activities he highlighted as being enjoyable was a writing activity. In fact, he chose this activity as his favourite activity in the learning element. In this project:

We did our own complete fairy tale with a book and everything called “Dragon and the Witch.” I liked it because we got to put anything we want in it.

However, prior to this activity a sequence of learning activities had transformed Mark’s understanding of fairytales. In initially describing what he knew about fairytales, Mark had mainly focussed on an array of different characters such as fairies, witches and “evil wolves”. Through a sequence of activities involving Conceptualising by Naming, Conceptualising by Theorising and Analysing Critically, Mark was building an understanding of the features of narratives and in particular fairytales including the way language is used and how different elements of the text such as the setting or plot can be changed to create new visual and written narratives. The following is an example of these types of activities from the Conceptualising by Naming knowledge process:

Explicitly teach the language features of Fairy Tales and narrative structure focussing on adjectives and complex sentences.
Blank out adjectives in text, in pairs students re-create their own adjectives.
Jigsaw activity – students re-create narrative from fractured text. Labels provided to indicate features eg.: orientation, complication, resolution (Learning element B, 2007, p.11).

Through activities such as these Mark was learning the features of narrative texts and in particular fairytales and at the same time he was learning to innovate on existing texts to create new narratives by modifying existing elements of the text. For Mark, traditional fairytales had become a source of creative inspiration with his realisation that, “fairytales can be told in many ways.” With Mark further noting, “some of the best fairytales are from foreign countries and some have a sad ending.”

In the culminating collaborative activity, the teachers explicitly specified the purpose of the activity, which was to produce a fairytale to be used in a performance for younger students. As the culminating activity for the whole learning element, they also specified that the
fairytale must have a narrative structure and include illustrations. However, within these parameters the students were given creative freedom with the content of the fairytale as well as the mode of presentation to the younger students including the use of “video, play, readers theatre, audio book, film strip, artwork” (Learning element B, 2007, p.16). This creative freedom and agency was Mark’s stated reason for his enjoyment of the activity. In Carspecken’s (2002) terms, this activity satisfied the students’ need for self-expression creating a sense of agency that acted as a powerful motivating force in the completion of the activity.

Although the teachers had designed the learning activity, the students in the group had control of the product produced by their combined creative endeavours, including the content, and the medium and mode used to present their fairytale to the younger students. However, without the carefully designed sequence of learning activities incorporating the eight knowledge processes, Mark would not have had the necessary understandings and knowledge to complete this project that required an understanding of the conventional features of narrative texts and how these could be used and innovated upon in the creation of new visual and written narratives. For example, Mark needed to use the conventional narrative structure of orientation, complication and resolution in writing the story, however, he realised that the characters did not necessarily have to live happily ever after and the story could even be set in contemporary times.

From a performance perspective, Mark had shifted from working consistently at an autonomous competence level to working at a collaborative competence level across the eight knowledge processes. He was engaging with the concepts and language of the learning area using appropriate structure and language features, with his response data indicating that his use of subject specific language such as using illustration instead of drawing or picture was above the cohort median. He was also working collaboratively with others on small group work activities as well as larger projects such as the culminating activity and sharing his work with a wider audience. Although Mark enjoyed aspects of the learning element, he remained critical of activities where he did not fully understand their purpose or importance. For example, he did not initially fully grasp the significance of comparing the features of traditional fairytales with modern versions. He also stated a preference for interactive activities where he felt he was actively engaged in the learning and participating in new experiences. It may have been easy to label Mark as dissatisfied or perhaps even
disrespectful; however, in reality Mark was an articulate and aware educational consumer with decided ideas about what he expected from learning programs.

6.1.1.2 Trent

Eleven-year-old Trent was the self-confessed under-performer who recognised that when he was not interested in the work he didn’t always produce his best work. In fact, at the beginning of the year he was assessed by his teacher to be performing at an assisted competence level across six of the eight knowledge processes. However, he loved a challenge and to engage in deep thinking and debate about issues that interested him. For Trent, working with the complex knowledge and issues within the environmental education learning element was an irresistible challenge:

I feel it’s a great program and that the work before helped me with solving the mystery. I can’t get to sleep at night because our class have narrowed it down to a few things. I can’t wait until we find out. Now when I go for a shower with buckets I think of our wetlands.

Trent’s journal entry captured his enthusiasm for the learning element, indicating that the learning was spilling over into his lifeworld. Again as with Mark, there was a sense that he was engaging with the learning because he considered it to be challenging and important but also because it connected with his lifeworld experiences (Frydenberg et al., 2005; Kalantzis & Cope, 2005; Lingard, 2007).

Trent’s explanation of the engaging qualities of this learning element included the detailed nature of the work. He observed that in this learning element students were involved in more thinking:

It was a lot more brought together. You got to learn with the computer. You’re thinking a lot more from the start of the year. Ms Sure gave us sheets and stuff but the more hands on stuff like going to the pond and wetlands, you can actually see what we are doing and shows what we are learning. If we hadn’t done all this work before we wouldn’t have understood what he was talking about at the wetlands. But now I understand all the words and what he was talking about, about fertilisers and things.
In Trent’s initial assessment it was noted that he was experiencing difficulty with the more complex knowledge processes involving conceptualising and analysing, performing at an assisted competence level in these knowledge processes with Trent alluding to his difficulties with understanding the language of subject areas in the above extract from a learning conversation. During this learning element something changed for Trent as at the end of the year he was performing at a collaborative competence level in these knowledge processes. When examining the learning element, it was discovered that there was a significant emphasis on building the language and concepts of the subject area with, for example, the students engaged in a series of learning activities in the knowledge processes of *Experiencing the New, Conceptualising by Naming* and *Conceptualising by Theorising* on the water cycle. This included experiments on condensation and evaporation as well as using interactive websites on the water cycle, culminating in a final *Conceptualising by Naming* activity to reinforce the terminology:

From the experiments, the terms used in the book, internet and song, redraw and label water cycle using these terms:


Similarly, through the jigsaw activities Trent learnt the terminology associated with environmental pollutants. He used words such as fertiliser, herbicide and pesticide in talking about the issues. The students then made use of their new found knowledge to analyse different environmental issues and to debate differing perspectives. Trent described the learning from this exchange of ideas as follows:

We were learning from each other. It is like tennis. They give us an idea and then we give them an idea.

Within these collaborative learning activities, the students also had to reflect on their learning, Trent stated, “we had to think about what we learnt from activities.” This further reinforced the learning and encouraged them to refine their thinking as they shared their learning with others. At the end of the learning element, Trent’s teacher commented on his environmental accusation, “Well done, you’ve used your investigative skills to justify your accusations.” He was able to use his understanding of the concepts of the subject area to solve the environmental mystery and support his analysis with appropriate evidence. For example, in
his identification of the environmental villain he wrote, “I think it’s fertilisers because it could
put the turbidity in the water and Brooke said she put it on the golf course and the sprinklers
could put it into runoff.” The importance of this deep learning has been emphasised in the
work of Kalantzis and Cope (2005), Gee (2006), Ritchhart (2007) and the Queensland School
Reform Longitudinal Study (Lingard, 2007). For Trent, the deep nature of the learning that
involved him in thinking rather than merely completing work was important in engaging him
in the learning and transforming his understandings about environmental issues. This type of
deep learning is considered to be an important component of a quality contemporary
curriculum (Kalantzis and Cope, 2005; Darling-Hammond, 2006; Lingard, 2007; Ritchhart,
2007).

In trying to further understand Trent’s reasons for his engagement with this learning element
he was asked to compare this experience with previous learning experiences:

I like it a lot better. It’s a lot more detailed than some of the others. From last year to
this year and from kindergarten to now, there’s a lot of difference. One was just
writing things down and going on just one excursion but for this one we went down to
the lake and we had to draw what we saw and heard and we didn’t do stuff like that in
previous years…the way she teaches is different, good different to previous teachers.
The thing that stood out for me, the change from before to here, when we got this it
wasn’t like learning it was more like a game but I was surprised how much more work
you had to do but I’m getting used to it.

In this explanation, Trent highlighted the interactive nature of the learning, comparing it to a
game. This was also reflected in the coded data from his responses in his learning journal
entries and conversations with Trent recording the highest number of references to
interactivity and the second highest number of personal connections to the learning.

The importance of interactivity was emphasised in Gee’s work on computer games and
affinity spaces (2004, 2006) and Burbules’ (2004) work on virtual environments with
Burbules noting that these interactive qualities were not restricted to virtual environments. In
this case, the interactivity alluded to by Trent was created in a combination of virtual and real
spaces. In his learning journal entries and conversations, Trent highlighted the importance of
real life experiences such as visiting the lake and the wetlands to observe the environment and
to conduct experiments with Trent explaining:
We went down to the pond and we drew pictures and wrote about how we felt. It was a good idea because we only have pictures here but there we can actually look at what we are doing to our water.

Therefore, learning activities involving the knowledge process of *Experiencing the New* when combined with the conceptualising knowledge processes were important to Trent’s engagement with the learning. This was supplemented with collaborative classroom activities in which students engaged in problem solving and debate about real environmental issues. In these activities, Trent was also an active participant taking on varying roles including scribe and spokesperson. In reflecting on the learning he noted, “it’s not like learning, it’s more like a quiz or a game so it’s funner.”

In considering Trent’s engagement with this learning element, it was impossible not to consider the possibility that it was purely the subject matter that captured Trent’s imagination. Maybe Trent was passionate about the environment just like the boy in Rowe’s (2003) research who was interested in sport and military aircraft. Visiting Trent again in the middle of his new learning element revealed that this was not the case. In fact, he indicated that he was enjoying the new learning element just as much even though the focus was on the Arts and Technology. He had already completed an involved homework project that combined his own love of music with his mother’s interest in visual arts. With this project, Trent set himself a challenge producing an elaborate piece of work involving design, internet research, interviewing, documenting through photographs and journaling, and the completion of a work of art. He drew on knowledge from his studies at school as well as accessing outside expertise to achieve his goals. He was successfully transferring knowledge that he had gained in the classroom about ways of working to an independent project. He demonstrated a strong personal commitment to the project in his investment of time and effort even though he admitted to experiencing some doubts as to whether he would succeed in his endeavours:

I’m thinking that my idea is risky but some things you need to do but I think it will pay off hopefully.

Trent was not daunted by the challenges his project presented; instead he demonstrated a determination to work through the complexities of the task. In working on this project, Trent
had a strong sense of agency taking responsibility for all aspects of the work. For Trent both
the process as well as the product proved to be highly satisfactory as he reflected:

I give my guitar 10 out of 10…..How good is that! It’s hard for me to admit it, but it is
true, the guitar does look that good don’t you think?

It was hard to believe that this was the work of a self-confessed under-performer. Instead this
was the work of a highly motivated achiever. At the end of the year with Trent’s
demonstrated interests in the Arts as well as Science, it was surprising to hear him declare
that:

My favourite subject is English because I think a lot of lifestyle skills and you learn
how to properly write. You get to improve your punctuation and writing skills like
when you get a job you might need to write a lot and if you’re not a good writer they
won’t be able to read your writing.

Literacy had become important to Trent as he realised the power of written communication
along with oral and visual forms of expression. Through the different learning elements he
had experienced how people communicate in different ways for different purposes and those
skills had become valuable to him. For example, working on the environmental education
learning element, the students engaged in a Conceptualising by Theorising activity where the
teachers role played a debate and then explicitly taught students the structure and language
features of expositions. Trent commented on how the debate helped him to develop his
written exposition “it ran me through the exposition very easily.” Trent wanted his knowledge
to be sharable. In many ways, it is evident that Trent was managing his own learning. He was
aware of the knowledge and skills he needed and was capable of seeking out expertise when
he needed it. He also showed that that he was aware of the teachers’ learning design and the
importance of learning the language and concepts of the subject area to assist with further
learning. In his comments on the environmental education learning element, he noted:

The debate helped and all the other work before. Then we had an idea about what
fertilisers were, what pesticides and herbicides were. We could learn what they were
doing and we could understand what they were doing to the environment. That helped
with the mystery.
Trent was using the language and concepts of the subject area to think deeply about environmental issues and to communicate his ideas to others. From working largely at an assisted competence level at the beginning of the year, Trent’s performance had improved so that at the end of the learning element he was working at a collaborative competence level in all the knowledge processes except Applying Creatively in which, he was performing at an autonomous competence level.

Trent clearly wanted learning to be challenging but he also valued the supportive scaffolds in the teachers’ learning design that helped him to meet those challenges. In Frydenberg, Ainley and Russell’s (2005) paper on student engagement this was the type of activity that students considered to be challenging, one with “a goal or end to work towards, to achieve, and reasonable confidence of being successful” (p. 7). In essence, Trent worked best when the learning was within what Vygotsky termed was the zone of proximal development (Vygotsky, 1962). For Kalantzis and Cope (2005), learner transformation is achieved through a learning journey to the new and unfamiliar but like in Vygotsky’s zone of proximal development the learning must always occur at “just the right distance from the learner’s lifeworld starting point” (p. 51). For Trent, these scaffolds included activities that supported him to learn the language and concepts of the learning area with all its specialist terminology. Interestingly, Trent recorded above the cohort median for use of specialist language in his learning journal entries and conversations, demonstrating that this language had become a part of his repertoire. He was using terms such as runoff, salinity and turbidity in his written work as well as conversations about his work. The scaffolds such as the student developed “Cooperative Group Work Rubric” and the accompanying self assessments supported the development of collaborative work skills that were also important for Trent to be able to effectively participate in knowledge sharing, debate and complex problem solving with his peers. Trent recognised the importance of listening to others’ perspectives as well as contributing his own ideas.

Like Mark, Trent had definite ideas about the type of learning experiences he enjoyed, the elements of the learning design he found helpful and the ways the teacher worked that supported his learning. With these decided opinions and before learning the social skills necessary for effective collaborative work, it is not surprising that at times his attempts to express his perspectives may have been considered to be disrespectful and disruptive. It is also not surprising that without sufficiently challenging activities, scaffolds to support his
learning and tasks that afforded him a sense of personal agency over his learning, Trent, at
times, failed to engage with learning activities and to perform to his potential.

6.1.1.3 Sam

Ten-year-old Sam was the independent learner with decided ideas about what he expected
from learning activities. Although he was not considered to be a marked under-performer at
the beginning of the year, performing consistently at an autonomous competence level, it was
suspected that he was not working to his full potential, with even one of his peers noting,
“Sam’s got the brains and he has good writing.” His teacher wanted to increase his
engagement with the learning and for Sam to more fully communicate his ideas to others both
orally and in writing. Sam himself considered that the learning program the previous year:

…was just way too easy for me. I like things, which are more challenging. It can help
you for when you are in year 6. It helps me to challenge myself. It helps me to learn
more so I don’t get stuck later on.

Like Mark, he wanted the work to be challenging but there was also a sense that he wanted
the work to be important and real with “connections to the world beyond the classroom”
(Lingard, 2007, p.254). Through the environmental education learning element, Sam was
becoming an environmental researcher:

I liked discovering more about catchment areas, picking up evidence that helps you
along the way, and working on temperature and climate statistics…
We learnt about the silt trap. When a rivers coming in the water starts to slow and
pushes to the side. I learnt that the water that looked dirty was actually low in turbidity
and the temperature was good. The animals we found in there pointed to the fact that it
was good water because they don’t like turbidity. We found tadpoles and frogs. I’d
learnt things over the years but I didn’t know about dredging and how dreadful
fertilisers can be because they can ruin, poison the soil that runs into the river and
form blue green algae and salvinia. Salvinia is alligator weed, like a lily pad with flat
holes in it.

Sam thrived on the acquisition of the language and concepts of the subject area, quickly
making them a part of his own vocabulary with Sam recording above the cohort median for
use of subject specific language, using terms such as silt trap, turbidity and catchment. The
combination of learning activities in the *Experiencing the New, Conceptualising by Naming* and *Conceptualising by Theorising* knowledge processes supported Sam to build his conceptual understandings in a meaningful context that mirrored the work of scientists in the field. In the learning element, an *Experiencing the New* activity that involved a catchment simulation drew a strong personal response from Sam, which further fired his interest in learning about catchments:

We were given a name and a job. There were cigarette butts, paint, fertilizers, dog droppings. We had to tip things in. It is too dirty to go near and it took a lot of effort to get rid off. In that one we got interviewed by a camera and I had to tell how I felt about it and I said I never want to see anything like that again. I found that if you put something in your soil, one day it’s going to go into a catchment.

Later in engaging in deep thinking about environmental problems in the analysing knowledge processes, Sam was able to speak with authority on the issues such as the impact of nutrients on water quality and to use his new found knowledge to develop and support his arguments. In many ways, he was becoming a member of a knowledge community using their language, concepts and skills to build new knowledge and to communicate ideas. Sam declared his favourite aspects of the learning element were “discovering more about catchment areas, picking up evidence that helps you along the way, and working on temperature and climate statistics.”

Both Brown (2006) and Ritchhart (2007) consider this to be an important part of 21st century learning and curriculum with Brown describing this involvement with a community of practice as “engaging in productive enquiry, that aspect of any activity in which we deliberately seek what we need in order to do what we want to do” (p.20). In other words, the learning activity has a clear purpose. Ritchhart (2007) like Brown (2006) wants students to learn through being, “rather than learning about maths, science, writing, history and so on, students must become mathematicians, scientists, authors, and historians to build the disciplinary understanding” (p. 40). Sam would concur with this sentiment, explaining, “it is better than other units of work because it is more thought provoking and it’s more into it and we are actually doing more work on the subject.” He wanted to build up his bank of disciplinary knowledge to become an expert on the subject.
When we look back at learning element A, we find that the learning was focused on solving the environmental mystery, with students acquiring disciplinary knowledge and skills along the way that would support them in this process. This included the jigsaw activities where students participated in expert groups on environmental issues:

Villains – Who are the baddies?
Watch video: ‘A Case Study in Water Care – Murray-Darling Basin’
Jigsaw Activity:
Students start in a home group. You have to research and gather information to take back to your group making you the expert for your group.
The topics for the first Jigsaw Activity are:
The topics for the second Jigsaw Activity are:
You must record these things in your book:
Description of issue, Effects on the water system, and Draw a picture.
When finished the Jigsaw Activity, make a personal response in the front of your Values Journal about your group’s effectiveness throughout the activity (Learning Element A, 2007, pp.17-18).

This expert knowledge was important in solving the mystery but it also supported the students in their goal of understanding the impact of human activity on the environment, especially on water quality.

Sam had a sense of the importance of the work and enjoyed having the opportunity to express a personal opinion on these issues:

I definitely now have a much better understanding of catchments and stuff. I liked the activities where the kids were involved and argued about what we stand for and we could learn from other people’s ideas.

Sam had earlier already emphasised that he preferred activities such as the “Farmers versus Developers” debate involving the Analysing Critically knowledge process in which he could express his own opinions where, in Carspecken’s (2002) terms, there was student agency and an opportunity for self-expression. The interactive nature of many of the activities was also
important to him with Sam recording above the cohort median for references to interactivity, which is reflected in the quote above. He wanted to be actively involved in the learning rather than passively receiving others’ authorised versions of knowledge. Sam considered the most boring part of the learning element to be the recording of the prescribed clues from the internet, preferring to collect clues from real contexts such as the water testing they conducted on their wetlands excursion.

Despite Sam’s earlier confessions of the problems associated with collaborative activities, these very activities provided him with greater opportunities for self-expression and interaction. As the group activities involved student-to-student interaction that was not necessarily mediated through adults, Sam needed to make more of an effort to ensure that he was communicating his ideas clearly and fully. He was exposed to other ideas and needed to support his arguments with evidence when confronted with contrary points of view. These activities also linked closely with the students’ written work that involved the students supporting their hypotheses with evidence. Although Sam’s teacher would have liked Sam to even further elaborate his ideas in writing, it was clear that he was making an effort to support his arguments with evidence. For example, in trying to support his hypothesis of the environmental crime site he wrote:

```
Hexham has the narrowed down victim in it and it is slow flowing so it could have a trace of salvinia. We eliminated others because they had a good water level. From tests others didn’t have the right climate stats.
```

It is evident from Sam’s performance assessment at the end of the year that the communication goals set for him at the beginning of the year had been achieved with Sam performing at a collaborative competence level across the eight knowledge processes. His understandings and communication skills were such that he could effectively apply his knowledge in working collaboratively on shared goals involving complex, multi-faceted problems and tasks, including working with his peers on a catchment management plan. His oral communication skills were particularly impressive although he still needed some encouragement to communicate more fully in writing; however, this had also improved by the end of the year.

For Sam, Mark and Trent the keys to their engagement were goal-oriented, challenging activities with real life importance. They also had a strong need for a sense of agency in the
learning process, seeking opportunities for self-expression. Despite this desire to assert control over their own learning, they still valued activities that scaffolded their endeavours through explicit goals, instructions and explanations. These scaffolds demystified the activities and supported them to succeed, and even to take greater risks in their learning endeavours as in the case of Trent’s homework project. Sam, Mark and Trent remained critical consumers but ones with an appreciation of the teachers’ efforts to support their learning, acknowledging the supportive features of their learning designs.

6.1.2 Capable Operators

In contrast to the critical consumers, the capable operators are unlikely to be labelled with Kenway and Bullen’s (2005) 5Ds for they are rarely openly critical of their learning experiences. Any dissatisfaction they may feel is not exhibited through disruptive behaviours and is not readily apparent in their academic performance. In many ways, these students may be considered by teachers to be ideal students, generally exhibiting enthusiasm and interest in learning activities. Within the Students Learning by Design study, this group of ‘ideal’ learners is represented by Julia, Emma and Steve. These students’ experiences of schooling are of a sense of belonging to the learning setting as well as to the learning (Kalantzis & Cope, 2005).

It is suspected that these capable operators would to a certain extent perform successfully even in more traditional education settings that value compliance, acceptance of established rules and respect for authority figures (Kalantzis & Cope, 2005). Through their lifeworld experiences these students have acquired the requisite cultural capital to successfully operate within formal schooling institutions (Bourdieu & Passeron, 1977). As argued by Schilling (1993) and Valentine (2001), these students have internalised or at least accepted the myriad of adult determined rules and codes of conduct that govern the social systems within schools. This includes bodily controls governing movement within the institutions as well as expressive and social controls related to classroom interactions. Importantly, through their lifeworld connections, these students have access to the intellectual resources necessary for academic success in schools, the resources that Lingard (2007) feared were demanded by schools but not readily available to all students, and in particular, students from disadvantaged communities.

However, when directly questioned it is evident that these capable operators also have considered opinions about their learning experiences and are children of the choice generation.
with multi-layered identities (Yon, 2000; Kalantzis & Cope, 2005). These students not only possess cultural knowledge that is valuable in the cultural context of schools but they reflect on this knowledge in the creation of their identities as learners. They are actively making choices about the aspects of their identities they choose to express and those they choose to repress within the school context. In effect, they are engaged in a self-reflexive process in which “people act upon knowledge, even as it acts upon them” (Yon, 2000, p.3). They are aware of the choices they are making within the classroom context and the consequences of these choices. They have developed a philosophical approach to learning with an acceptance of both the positive as well as negative features of different learning activities with an emphasis on making the most of the positive aspects of schooling. In many ways, this reflective quality may contribute, as much to their success as the cultural capital they possess as they negotiate different institutions and social groups within our increasingly diverse and interconnected world.

6.1.2.1 Julia

On meeting Julia, we encountered a quietly, confident eleven-year-old who was highly regarded by her teachers for her interest in learning and her well developed social skills. She was considered to be a capable student who was already operating consistently at an autonomous competence level across the eight knowledge processes. This posed the question of what *Learning by Design* have to offer this capable operator? Would it work in her favour or would she be in some way disadvantaged by this new approach to learning?

Julia herself provided the considered opinion that she preferred the learning elements this year to previous learning programs she had participated in because she felt the students and teachers were more involved in the learning. Julia indicated a strong preference for these activities in which students were actively involved including excursions where they could witness the effects of land clearing for themselves. In commenting on the positive qualities of the learning element, she also made repeated personal links to the learning recording above the cohort median for references to personal connection as well as interactivity in the response data. Julia reflected:

I like how we didn’t just discuss it in class but we went out and saw the land clearing near the pond. You did how you feel, what you see and what you hear, and you had to pick the victims and villains. We saw them working so you could see how it affected the groundwater.
These learning activities involving the *Experiencing the New* knowledge process embedded the learning in a real context making the learning more relevant and immediate as the environmental damage was occurring in her local area. Even though the Queensland School Reform Longitudinal Study (Lingard, 2007) particularly emphasised the importance of learning connectedness for disadvantaged students, it would seem that capable operators also valued learning that was connected to real world experiences. Despite capable operators being better able to cope with decontextualised learning because of the cultural capital they possess, as argued by Lingard (2007), Julia’s comments suggest that their engagement with the learning is enhanced through the contextualisation of the learning. This type of activity in the learning design also drew on Julia’s strength in reflecting on knowledge, initially at a personal level by requiring her to articulate her feelings about what she was experiencing, Julia wrote:

> I just saw an example of what our urban water turns into because of humans. And this is really disappointing to see that we make our water so grubby! I felt disgusted and sad, but also in a way I am angry at myself because I know that sometimes I litter too.

She was then guided to think more deeply about the situation and to critically analyse who the winners and losers were in the situation as well as identifying who was ultimately responsible for the current situation and what could be done about it.

Julia as a capable student was accustomed to completing most tasks with little difficulty, however, when faced with a project with significant knowledge demands and complex issues, she openly acknowledged the value of collaboration and knowledge sharing:

> I liked the jigsaw activity - each group learns about a different activity and I was learning about sediment and silt and then you go back to your table and you share your ideas. You mainly learn about one thing but then you go off and you can learn more, more quickly… My favourite thing about it was that you had to get all the clues and figure it out so it was a lot better than I thought it would be. It was interesting because you get this huge idea but then you had to learn about something else but you still needed that information because it was important so it wasn’t a straight line…. I don’t think I would have been able to work it out if I was just by myself.
The intellectually challenging nature of the activity was important to Julia’s enjoyment of the learning, with Julia recording above the cohort median for references to intellectual challenge. The complexity of the problem made collaboration desirable but also provided a purpose for learning about a range of environmental concepts, with the realisation that the different pieces of knowledge she was acquiring along the way were important for ultimately solving the mystery, thus, increasing her engagement with the learning. In her environmental accusation she confidently used these clues to support her case as demonstrated by the following extract:

I think that our villain is salvinia because the principal emptied her school pond into the wetlands and this could cause plants such as salvinia to grow. We also crossed off cane toads because there weren’t any in the area...herbicides because they weren’t being used at that time. Pussy willow was not able to grow in warm climates so that was able to be crossed off.

This was despite the fact that she found recording the clues boring especially if she missed out on some clues when she was away.

Collaborative and knowledge sharing activities also appealed to Julia because they provided her with opportunities to work with different people and to consider alternative perspectives on issues. Julia considered that she learnt more through exposure to other people’s opinions including those of fellow students as well as other teachers in the unit. In further describing some of her favourite activities in the learning element, Julia stated:

I enjoyed the debates we had and I learnt heaps when I got to hear the different points of view. I got put on a side I didn’t agree with but people made good points and I could understand their point of view and I learnt more.

Later on, in her learning journal she added:

I learnt that there are more points that make you want to change your mind. I really enjoyed the activity because it really makes you think hard and you are learning why people disagree or agree which is very interesting!

Again, this learning activity drew on Julia’s strength in reflecting on new knowledge and challenged her existing ideas by requiring her to operate in the Analysing Critically.
knowledge process engaging her in deep thinking about the issues. Her understandings were enhanced by her exposure to the thought processes and ideas of others. Julia herself concluded that this activity helped her to develop a clearer argument later on when writing her exposition.

The collaborative and knowledge sharing activities highlighted by Julia run contrary to the criticisms of contemporary schooling presented by Jenkins et al. (2006) who argues that “schools are currently still training autonomous problem-solvers, whereas as students enter the workplace, they are increasingly being asked to work in teams, drawing on different sets of expertise, and collaborating to solve problems” (p. 21). It would seem that the design of this environmental education learning element using the Learning by Design framework is addressing this concern by providing opportunities for the students to work collaboratively on complex problems, engaging them in deep thinking and intellectually challenging projects that draw on the expertise of all team members. The impact on Julia’s performance was evident in her assessment at the end of the year, shifting from an autonomous competence level at the beginning of the year to a collaborative competence level across the eight knowledge processes. In summing up her reasons for preferring collaborative and highly participative activities, Julia stated, “if you don’t have fun you’re not willing to try.” Although as a capable operator Julia’s performance was always satisfactory, the intellectual challenge presented by these activities provided an added incentive to her efforts, resulting in enhanced academic performance.

6.1.2.2 Emma

In contrast to the quietly confident Julia, meeting Emma we found a lively, chatty eleven-year-old with an overt confidence in her abilities, making assertions such as:

I’m over my reading level. I’m a better reader than most of the people in my class.

Also unlike Julia, Emma had travelled extensively and had experience of a number of different schools. However, despite these differences in personality and life experiences, they shared an interest in learning along with the social skills necessary to operate effectively in the school environment. As with Julia, there was a sense that she was conscious of her behavioural choices, alluding to how she had learnt to manage changing schools every couple of years, admitting to frustration at having to learn new ways of doing things, and having to
make new friends but also recognising that “because I’ve been travelling so much I’m used to other people and I make friends easily.”

Through her experiences in a number of different schools, Emma had the perfect opportunity to develop an understanding of the general codes of conduct and rules that govern social interaction and behaviour in schools as outlined by Schilling (1993) and Valentine (2001). Importantly, Emma had also developed an understanding of the academic knowledge valued by schools, focusing much of her attention on literacy and numeracy. From Emma’s responses during learning conversations, it was evident that these values were also reinforced in the home:

I’m good at word definitions. My grandfather would make me look at a dictionary at a young age. I can do my spelling quicker than anyone in the class.

She attributed her love of reading to her parents who had a whole bookshelf full of books. She went on to describe how her father and grandfather were also helping her to learn another language. In many ways, Emma can be considered to possess Passeron and Bourdieu’s (1977) concept of the requisite cultural capital to succeed in schools with even her private music lessons supporting her participation in the school band. For Emma, there was a close match between the values and social knowledge gained through her lifeworld experiences and those of traditional schools.

This was also reflected in Emma’s academic performance, recording a consistent autonomous competence rating across the eight knowledge processes at the beginning of the year. In Jenkins et al’s (2006) terms, this autonomous competence is exactly the goal of many schools today despite the emphasis on collaboration in the workforce. However, Emma herself valued collaboration and knowledge sharing, reflecting, “I think they should use groups more often than they do.” She recorded above the cohort median for positive responses to collaboration and knowledge sharing. Emma’s sense that there were not enough collaborative activities, despite the analysis of learning element B revealing that fifty-five percent of activities involved knowledge sharing and collaboration, may be due to the absence of a formal social skills component and structures to support collaborative group work.

The impact of this for Emma was particularly evident in the Analysing Critically knowledge process where no shift in performance was recorded during the year. Despite her obvious
enjoyment of the fairytale focus of the learning element, Emma expressed disappointment that she was familiar with many of the fairytales they were examining during the program:

I think it’s a great idea to learn about making stories and reading. What I dislike is the stories we’ve been reading. I’ve read them already. It’s an interesting thing to work on stories for kids younger than my age. It helps to experience how to be a writer, to create some of your own ideas.

Within the *Analysing Critically* knowledge process there was an opportunity to take her deeper into these fairytales and enhance her intellectual engagement with the texts to take her beyond the basic narrative. With a more scaffolded approach to the activity the students may have been better able to challenge each other’s ideas and to extend their thinking about the narrative. For example, in the following *Analysing Critically* activity more guidance could have been provided as to issues the students might consider when viewing the film:

View film “Cinderella story
Takes notes as you did during “Ever After”
As a whole group, discuss PMI effects on audience (Learning element B, 2007, p.15).

In viewing the film, the students could have explored the underlying messages in the fairytales and their impact on the audience as well as examining the messages about stereotypes conveyed in the film’s portrayal of the characters. In this way, the students would have engaged with an approach consistent with contemporary understandings of literacy:

The social production of meaning is more than individual interpretation multiplied; it represents a qualitative difference in the ways we make sense of cultural experience, and in that sense, it represents a profound change in how we understand literacy (Jenkins et al., 2006, p. 20).

This may have given Emma a fresh perspective on these familiar stories. It would also have provided her with experience in knowledge sharing for the activities in the applying knowledge processes where again Emma did not record a shift in performance. With Emma’s evident imagination and creativity as well as her literacy skills, there was a missed opportunity for her to effectively share her expertise with others whilst benefiting from the feedback of others. Despite this Emma revealed:
I did a massive story. I did more than I was supposed to, I did around about eight pages. Mine’s about an elf that decides to clean up the woods.

Overall, Emma’s recorded shift in performance at the end of the year was above the cohort median, with Emma performing at a collaborative competence level across six of the knowledge processes. It may be speculated that with a few changes to the learning design, incorporating some scaffolds to support students with knowledge sharing and collaborative activities that involve more intellectually challenging tasks such as those in the Analysing Critically knowledge process, would have enhanced Emma’s performance further. Even with a capable operator such as Emma, it cannot be assumed that they can engage in deep, complex intellectual inquiry without structures to encourage these types of thinking processes. Kalantzis and Cope (2005) contend that, “For every student in every learning setting, the comfort zone of proximal development is going to be different” (p. 49). Capable operators, like all students, have a zone of proximal development; the challenge is to find it and to support their transformation with the appropriate scaffolds.

6.1.2.3 Steve

Like Emma, on encountering Steve we found an overtly confident eleven-year-old with a generally positive attitude to learning. Straight away at the beginning of the learning element he displayed enthusiasm for the area of study:

We are learning about fairy tales, I am looking forward to it. I think it will be fun because we are making our own fairy tales. We can use a video camera to film a play. I love using stuff like that. I am good at it. A lot of story telling will be involved and hopefully a movie or two. I don’t think I will not like anything so it’s all good. I’m looking forward to all the work.

For Steve, this learning area focussed on his self-confessed areas of academic strength involving reading and creative writing, with Steve declaring, “I like creating different characters and making up different problems for them.” Complementing these academic strengths were well-developed social skills, enabling him to work effectively in group contexts. Steve explained, “I’m really friendly to everyone so I can suit their style so it’s easy to work with partners.” The learning area also linked closely with his lifeworld interests, with Steve revealing that he does “a lot of speech stuff and acting.” Steve could immediately see
the possibilities for showcasing his talents through this learning element. This close match between what was valued in the learning context and his strengths and interests ensured that there was a strong sense of belonging in the learning.

However, for this capable operator there was a danger that with this close match between his strengths along with his lifeworld experiences and the learning element, there would be little transformation. For it must be remembered that, “learning is a journey away from the learner’s comfort zone…” (Kalantzis & Cope, 2005, p.47). In the case of Steve, this fear was unfounded. At the beginning of the year he was assessed to be performing consistently at an autonomous competence level but by the end of the year he was performing at a collaborative competence level across the eight knowledge processes. The difference for Steve appeared to be the opportunity to explore different media and modes of expression throughout the learning element that culminated in two collaborative projects involving the two applying knowledge processes.

In the first project, the students were required to appropriately apply their knowledge of narrative structure and illustrations to create a fairy tale for younger students. On completing this fairy tale, the students were engaged in Applying Creatively using their knowledge of mode and media to develop a presentation of this fairy tale to the younger students. Through these projects and the learning activities leading up to these projects, Steve was engaged with new concepts that built on his existing knowledge of creative expression and communication with an audience. The teachers focussed on the students “understanding different modes used in texts they view, listen to and read – eg music, print, voice” (Learning Element B, 2007, p.7). Steve was learning “the skills of the multimodal world of communication” (Kress, 2003, p.174). He was engaged in design work, selecting, arranging and transforming symbolic knowledge using a variety of modes. He was acquiring new skills that linked closely to contemporary children’s lifeworlds including the world of computer games (Kress, 2003; Gee, 2004 & 2006). These activities also included three of the features that Steve rated highly in his response data, recording responses above the cohort median for knowledge sharing and collaboration, interactivity and explicitness. For Steve, the creative project was the highlight of the learning element, “it’s fun doing all the news type stuff and acting like a reporter and putting in all the fairy tale stuff.” It would appear that Steve was able to draw on his lifeworld experiences in drama classes to develop successful strategies for working collaboratively with his group, unlike Emma who would have benefited from a more formal, supportive structure for collaboration within the learning design itself.
From Julia, Emma and Steve’s experiences, it is evident that capable operators are advantaged in many ways through the cultural capital they have gained from their lifeworld experiences giving them a strong sense of belonging to the school setting as well as to the learning. However, like critical consumers, they want the learning to be transformative, to deepen their understandings and to provide them with opportunities to use this knowledge. There is a sense that these students particularly benefit from activities where the role of the student is not that of a passive recipient of other people’s knowledge but rather that of a constructive critic, where students are encouraged to become creators of knowledge and to share this knowledge through an array of multimodal forms. These activities are designed to encourage students to share their ideas and collaboratively generate new ideas with their classmates as they build on each other’s ideas and challenge each other’s perspectives. Within the learning designs, these activities occurred largely in the knowledge processes of Analysing Critically, Applying Appropriately and Applying Creatively. These knowledge processes challenge capable operators to move beyond their comfort zones and to explore new and, at times, conflicting ideas, and to experiment with new modes of expression.

6.1.3 Unrewarded Workers

Initially, this group of learners presented a conundrum. Unlike the critical consumers, they could not be labelled with Kenway and Bullen’s (2005) 5Ds for on the whole they were not disruptive, disrespectful or openly dissatisfied. Quite the contrary, they exhibited compliant behaviours accepting the adult imposed rules and codes of conduct that govern schools (Schilling, 1993; Valentine, 2001). However, at the same time they were not capable operators for they were under-performing. They were expending effort on completing set tasks yet with little reward in the form of academic success. There was a sense that they did not belong in the learning even though they engaged with learning activities.

In this situation it may have been possible to do what Cummins (2001) accuses current educational reform efforts of doing which is to link this under-performance with individual student characteristics. Alternately, it could have been considered from Cummins’ (2001) perspective that “in social conditions of unequal power relations between groups, classroom interactions are never neutral with respect to the messages communicated to students about the value of their language, culture, intellect, and imagination” (pp.650-651). However, neither of these perspectives fully explained the experiences of these unrewarded workers. There was still something missing in the differentiation of the experiences of these students and their peers.
Within Kalantzis and Cope’s (2005) exploration of progressive curriculum there was a clue as to where the difficulty lay for these students in achieving school success. They observed that a subtle form of exclusion could operate in apparently inclusive learning environments where difference and diversity are highlighted:

Ostensibly, this is a classroom of open engagement, but if the rules of engagement don’t click, you won’t do well here. To succeed you need to get with the epistemological strength of the lifeworlds closest to the culture of curriculum, to think in a particular way, act in a particular way, communicate in a particular way and ultimately know in a particular way (Kalantzis & Cope, 2005, p.60).

Despite their differing socio-cultural backgrounds, their lifeworld experiences had instilled in them a set of expectations about schooling that more closely reflected the operation of more traditional schooling. There was a certain respect for teacher authority accompanied by a belief that schools value singular, authoritative notions of knowledge. The difficulty for these students was the mismatch between their expectations and the expectations of many contemporary classrooms that engage students in more open-ended activities that look for personal perspectives on knowledge. Although these unrewarded workers were not averse to engaging in these types of learning activities, they were unsure how to contribute their perspectives to the learning.

6.1.3.1 Marie

For eleven-year-old Marie, family relationships were important with many of her activities outside school involving social commitments with her extended family. It was evident from her comments that her family took an interest in her learning activities and supported her endeavours. This was further evident in her family’s attendance at school events such as learning journeys where students shared their learning experiences with family members, showing them the work they had completed during the semester. This support and interest was evident from various members of the family, including her older brother who provided feedback on her homework project writing:

I think Marie puts a lot of time into her work. She is a very artistic young girl.

Marie, herself, was eager to share her learning experiences with her family explaining:
I like to learn about environmental issues so when you learn about what’s causing them then you can work out what to do about them and I can tell others... I learn it myself and then I can tell my brothers and sisters and parents and friends.

From her family’s attitudes towards learning, Marie had internalised a valuing of education and deference for teacher authority. This was reflected in the way Marie always completed assigned tasks both for homework and at school. She would complete these tasks in a timely fashion and ensured that her work was presented neatly. The emphasis was on the completion of assigned tasks and on their presentation rather than on the expression of personal thoughts and ideas.

Despite her familial support and her own efforts, her work went largely unrewarded in terms of school success. There appeared to be a mismatch between what Marie and her family considered was valued by schools and what was actually expected by Marie’s teachers. Matthews (1980) argued that:

> The structure of schooling prefigures the productive relations in which students will find themselves. They receive from professional, certified teachers certain commodities, namely their own transformation into suitable and appropriate labour power, the type and amount of which is attested to by grades and certificates. The cost to students is not just monetary, but essentially involves willingness to participate in the process, and the preparedness to be appropriately transformed (p.193).

Although the links between schooling and employment are still strong, it is evident that participation and a willingness to be transformed are insufficient to ensure success as Marie’s case demonstrates. Marie was participating in learning activities and she was complying with overt teacher instructions in completing tasks. The fear for Marie was that despite her best efforts the failure to find the key to school success would also impact on her future employment prospects.

At the beginning of the year, Marie was performing at an assisted competence level in eight of the knowledge processes. Through discussions with her teacher and analysis of work samples, it appeared that Marie was not engaging with the knowledge resulting in misunderstandings and misconceptions. She often lacked deep understanding of the subject
matter. Instead she often restated factual information rather than using this information to support her position on issues. She was not critically analysing the information or looking for the causal links between actions and subsequent events.

Through a closer examination of her performance data, it was apparent that the evidence from the teacher’s comments as well as work samples was corroborated by the performance data, with Marie performing at an assisted competence level in the *Analysing Critically* knowledge process. The data also indicated that Marie was performing at an assisted competence level in the *Conceptualising by Naming* knowledge process, indicating that she may lack the subject specific language including language structures, to fully engage in discussions and written analyses of information. This was an area of concern Marie’s teacher had alluded to in her early assessments of Marie’s performance. With the difficulties Marie experienced in these two knowledge processes, it was unsurprising that she also experienced difficulty with the two applying knowledge processes. Without a deep understanding of the knowledge and language of the discipline it is difficult to use this information in both familiar and new contexts.

However, by the end of the year a dramatic shift in performance was noted with Marie recording a shift above the cohort median. She was performing at a collaborative competence level across six of the knowledge processes. Of particular note was her movement from an assisted competence level to a collaborative competence level in the knowledge processes of *Conceptualising by Naming* and *Analysing Critically*. To fully understand this transformation it was necessary to examine the environmental education learning element in the light of Marie’s response data.

In Marie’s response data, she recorded above the cohort median for explicitness and interactivity. When this was correlated with the data for the learning element, it was discovered that seventy-five percent of the activities in the *Conceptualising by Naming* and a hundred percent of the activities in the *Analysing Critically* knowledge process incorporated interactivity and explicit instruction. The following two *Analysing* activities from the learning element and accompanying student work illustrate the nature of these activities which incorporate both collaborative and individual tasks:

Divide a page of your book into 6 squares. Put a coloured hat in each box in order: white, yellow, black, red, green and then blue. Write a response to this question:
‘What do we use water for?’ using different thinking for each hat. As table groups, share ideas and write onto a large piece of paper with corresponding hat on it. When everyone is ready, move to the next hat and continue until all the hats have been done. Draw or find pictures to go with your writing. Discuss results as a class. (Learning element A, 2007, p.12).

Marie incorporated ideas under each of the different types of thinking around the key question “What do we use water for?”:

<table>
<thead>
<tr>
<th>White Hat</th>
<th>Black Hat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facts</strong></td>
<td><strong>Bad Things</strong></td>
</tr>
<tr>
<td>We need water</td>
<td>• People waste water.</td>
</tr>
<tr>
<td>• To drink and survive.</td>
<td>• Car washes every night.</td>
</tr>
<tr>
<td>• To be healthy and active.</td>
<td>• People waste water on watering their garden every night.</td>
</tr>
<tr>
<td>• So you don’t get dehydrated.</td>
<td>• Water fights.</td>
</tr>
<tr>
<td>• To have green grass.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yellow Hat</th>
<th>Red Hat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good things</strong></td>
<td><strong>Feelings</strong></td>
</tr>
<tr>
<td>• You can have green grass.</td>
<td>• Most people feel sad when there is no water.</td>
</tr>
<tr>
<td>• Your flowers will grow.</td>
<td>• I feel happy when we have water.</td>
</tr>
<tr>
<td>• To drink and be healthy.</td>
<td>• I feel sad when we have no water.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Green Hat</th>
<th>Blue Hat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Ideas</strong></td>
<td><strong>Thinking About Thinking</strong></td>
</tr>
<tr>
<td>• Don’t have long showers.</td>
<td>• Save water.</td>
</tr>
<tr>
<td>• Don’t wash your car all the time.</td>
<td>• Stop wasting water.</td>
</tr>
<tr>
<td></td>
<td>• Take care of water.</td>
</tr>
</tbody>
</table>

In your books, complete a T chart with the headings ‘Responsible Water Use’ and ‘Irresponsible Water Use’.

Share ideas as a class and copy any different ideas into your book with a different coloured pen.
Write a personal response in the back of your Values Journal about the responsibility we have for water and its use in today’s world. (Learning element A, 2007, p.12).

Marie’s T chart on water usage read as follows:

<table>
<thead>
<tr>
<th>Responsible</th>
<th>Irresponsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drink it.</td>
<td>Water fights.</td>
</tr>
<tr>
<td>Using recycled (grey) water.</td>
<td>Not covering pools.</td>
</tr>
<tr>
<td>Use water saving appliances.</td>
<td>Long showers.</td>
</tr>
<tr>
<td>Water-wise plants.</td>
<td>Not replacing washers on taps.</td>
</tr>
<tr>
<td>Wash car with recycled water from bucket.</td>
<td>Not turning taps off when brushing teeth.</td>
</tr>
<tr>
<td>Bucket in shower.</td>
<td>Washing cars on driveways with a hose.</td>
</tr>
<tr>
<td>Water garden with bore water.</td>
<td>Hosing down driveway.</td>
</tr>
<tr>
<td>Drip water system.</td>
<td>Not recycling water.</td>
</tr>
<tr>
<td>Water tank.</td>
<td></td>
</tr>
</tbody>
</table>

Marie valued her teacher’s ability to explain ideas to her students, especially noting her efforts in this area compared to teachers in the past. In Marie’s terms, “she makes it really easy for us.” In the learning element itself, we see evidence of this explicitness with students not only taught the vocabulary of the subject area but also the language structures and genre, with written activities often preceded by oral activities providing opportunities to practise the language. For example, the debate was used to support the students with the writing of their expositions by providing them with the opportunity to share and reflect on different ideas. The following extract from the learning element describes the debate activity:

The debate will have 2 teams and each team has to defend its plans for the land. One team is the Farmers – the other is the Developers. Think about how you would respond to these questions:

- Why do you need the land? What will the other team do to the land and surrounding areas? What will affect you, your lifestyle, job or home?

Write your own ideas down and Rally Robin to share ideas with your small group. Be prepared to think on your feet as well.

Come together as a class and start the debate. (Learning element A, 2007, p.15).

Commenting on this activity Marie wrote:
I think the Round Robin was a fun discussion because we all shared ideas with each other and defended each other. We were all encouraging each other. I learnt and got the idea of a clear argument…With class against class both teams were listening to what we had to say for them to defend themselves.

Another of these language building activities involved the knowledge process of Conceptualising by Naming:

Villains – Connecting the Effects
You will be given a set of cards with words relating to a particular environmental issue. Working in groups, create an effects wheel that shows connections between all the words. Other words can also be added – just ask the teacher.
When the group task is completed, write a personal reflection in the front of your Values Journal, thinking about the group effectiveness (Learning element A, 2007, p.18).

Through activities such as the Round Robin and the Scaffolded Effects Wheel, Marie was using the language in a meaningful context and she was learning how to support her ideas with evidence to build a strong argument.

Another important feature for Marie was personal connection as Marie recorded above the cohort median for this feature. This connection enhanced Marie’s engagement with the learning making the work more meaningful. One such activity which had a powerful impact on Marie was “Reaching Water – What are we doing!”

Choose a character and a related pollutant. Listen to the scenario and add your pollutant to the ‘catchment’.
Record your feelings in your reflective journal:
• What did you see?
• How did it make you feel?

Marie’s reflection read as follows:
What did you just see? Well, I just saw a disgusting and disappointing experiment. We put all these chemicals in the water. That is how the water in the creek is going to look like in the future.

How do you feel about what was happening? I felt very sad that the environment in the future is very bad and ugly. I also felt disgusted.

What can we do to be more responsible for the environment? We can stop putting rubbish down the drain and stop littering.

In the learning element, over eighty percent of activities in the Analysing Critically knowledge process involved an explicit personal connection to the learning through activities such as personal journal responses, individual brainstorm of ideas and personal goal setting. For example, after an excursion to the local pond to view the impact of a new housing development where the students conducted water quality tests, the students completed the following Analysing Critically activity:

Reaching Water – Who is responsible?
Using your ideas and flow chart from the previous discussion, complete a Y chart under these headings:
- Who wins?
- Who loses?
- Who is responsible?

Write a personal reflection in your Values Journal about what you have seen and how we can be more responsible for our waterways and the environment (Learning element A, 2007, p.16).

Marie’s response included the following:

I feel disappointed because the people doing this are people that are greedy, it is bad for their future, not just us and it is affecting the animals.

These types of activities were important for Marie as she came to realise that her personal perspectives were valued in the learning setting. This newfound confidence in her own understandings and perspectives was demonstrated in her willingness to question information and compare facts from different information sources including in the following activity:
Using all the information you have gathered and learnt, apply that knowledge and understanding by eliminating villains, victims, and crime sites to solve the crime. (Learning element A, 2007, p.19).

Marie reflected:

I thought it was Hexham Swamp because we had all these reasons. I found different information in my homework research. I found information on fertiliser and I thought it matched but then we got more clues and found it wasn’t fertiliser.

Marie was using knowledge to solve a problem rather than merely repeating researched facts. She was learning a new way of working with knowledge and in the process deepening her understanding of the subject area. On her written work, Marie’s teacher was beginning to make comments such as “excellent thinking,” reflecting Marie’s deeper engagement with the subject matter while Marie herself noted, “I learnt things and I was glad.”

Another important shift for Marie was learning to work collaboratively on tasks as she was accustomed to a more independent approach to learning. Although Marie enjoyed collaborative activities, at first she found working in groups problematic, confirming her teacher’s observations. She warmly acknowledged her teacher’s support and advice in selecting a work group and in establishing strategies to ensure the group worked effectively together. The development of these group work strategies was an integral component of the learning design as illustrated by the following two activities from the learning element:

Self assess your contributions to the group activity using questions like:

• What happened? Did I listen to others? Did I offer support? Did I contribute as best I could? Was I being responsible? How was I being responsible?

Record your actions on the rubric designed by your group.

When the self assessment has been made on the rubric, the next step is to ask questions of you such as:

• What can I do better?
• How can I be more responsible for my group’s outcomes?

Write the answer to these questions in a statement in your values journal. Setting two goals to work on in the next group activity. (Learning element A, 2007, p.22).
Marie’s values journal entry read as follows:

My team works very well when we are being a good team together. Me and my friends work very well together. I give my team a rating of 4/5 because they are so beautiful when they work well.

I mostly have the role of being the idea person of coming up with the ideas.

Not talk all the time. Make sure they learn and know what to do. Explain to them what’s the meaning of things.

Despite the initial difficulties, Marie found working in groups supported her learning. By working collaboratively on a complex project Marie needed to engage with the knowledge. In some activities she was responsible for learning something new that the other team members did not know about. An example of this is the following activity from the learning element:

Watch video: ‘A Case Study in Water Care – Murray-Darling Basin’

Jigsaw Activity: Students start in a home group. You have to research and gather information to take back to your group making you the expert for your group. The topics for the first Jigsaw Activity are:

The topics for the second Jigsaw Activity are:

You must record these things in your book:
Description of issue, Effects on the water system, and Draw a picture.
When finished the Jigsaw Activity, make a personal reflection in the front of yours Values Journal about your group’s effectiveness throughout the activity. (Learning element A, 2007, p.17).

The following extracts show Marie’s work in one of her expert groups and her reflection on what she learnt from one of the other experts in her home group:

Extract 1:
What does vegetation do to help the waterways?
• Roots hold soil in place. Prevents erosion.
• Root system absorbs water and uses water deep in the ground from the water table.
• Vegetation provides habitat for animals.
• Vegetation shades rivers.
• Vegetation can slow water flow.

Extract 2:
I learnt about silt and sediment. Well, sediment is the matter that settles to the bottom of a liquid. Silt is earthly matter, fine sand or the like, carried by moving or running water and deposits as sediment. That is something I learnt in one day.

Being the group expert meant that Marie needed to really understand the concepts so that she could share her knowledge with others. Marie’s efforts were recognised by her teacher who wrote on her work on vegetation and waterways “super jigsaw research work, Marie.” For Marie, this approach to learning was exciting:

I like working with groups – if you only have pairs you don’t get so many ideas but with other people you learn lots of things and they don’t always have to be friends because other people have different ideas and you can put your ideas together and you learn lots of things.

Marie had a sense that she was learning so much more than she had before in a similar space of time. In effect, she was learning more because she was engaging with the knowledge through her collaboration with others. Again, in her response data, Marie recorded above the cohort median for positive responses to knowledge sharing and collaboration.

Through these activities, Marie had opportunities to build a shared language for communicating about the subject area and to deepen her understandings about the discipline. Marie’s confidence in using this shared language was reflected in her learning journal entries where she used terms such as silt and sediment appropriately to explain her ideas. Marie’s increasing ability to use the language and concepts of the subject area was particularly important for as Gee (2006) argues much of school success depends on the comprehension of academic language. He contends that if students don’t learn the language in context “they may be able to pass paper and pencil tests, but they often can’t use the complex language of
the text to facilitate real problem solving, because they don’t actually understand how the language applies to the world in specific cases for solving problems” (Gee, 2006, p.7). The collaborative activities in the learning element provided opportunities for Marie and her peers to use the language in meaningful contexts, with Marie herself explaining:

I feel like I have learnt everything in this world because we have learnt about villains and victims. I feel like I have gone into a scientist’s head and have learnt how to use water samples. I am like Ms Sure because I stayed up all night and got clues and put them together as a plan. I feel so lucky that we are learning about this in such a short time it is so fun.

As advocated by Brown (2006), Marie was not just learning about science, she was becoming a scientist, using their language, concepts and tools. Despite the teacher’s earlier concerns about Marie’s comprehension and language use, she recorded above the cohort median for use of subject specific language, appropriately using terms such as erosion and habitat. She had made the language of the subject area her own in discussing and writing about the topic.

Overall, Marie had become a more vital presence in her own learning that went beyond surface participation in learning activities to a deeper engagement. She now belonged in the learning and she was enjoying learning more than ever before. Marie had not only solved the environmental mystery, she had also found the key to school success, something that had eluded her earlier in her schooling.

6.1.3.2 Rob

Initially on encountering Rob, we found a relatively reserved eleven-year-old who was well liked by his teachers and peers. Despite his intimate peer group including some very vocal critical consumers, Rob himself did not voice dissatisfaction with his learning experiences and carefully followed school and classroom codes of conduct. Like Marie, Rob’s family was supportive of his learning endeavours, making a special effort to assist him with his literacy difficulties, including attending courses with Rob outside of school hours.

Rob was aware of his literacy difficulties but this did not deter him from tackling the learning tasks set by his teachers. However, despite his best efforts, school success eluded him and at the beginning of the year, Rob’s teacher expressed serious concerns about his performance. The performance data at this time showed that he was performing at an assisted competence
level across five of the knowledge processes. As Rob was entering high school the following year, this caused added concern for his teacher.

However, while working on the environmental education learning element something changed for Rob as a learner, with him declaring, “it was probably one of the best I’ve ever done.” This was also reflected in his performance data as Rob recorded a result above the cohort median with an overall shift in performance of eight points. By the end of the year he was performing at a collaborative competence level in three of the knowledge processes and at an autonomous competence level across the remaining five knowledge processes. The step from assisted competence to autonomous competence was particularly important for Rob as greater learner independence would be expected from him in the high school setting.

In writing about the activities in his learning journal, Rob provided some valuable clues as to the aspects of the learning design that made a difference to his learning. In commenting on the ‘Round Robin’ activity in his learning journal, he wrote, “it was very clear to me I understood everything and it was fun as well.” This would indicate that this was not always the case for Rob. In examining the learning design closely, we found that a fifth of the activities in the learning element involved the building of a shared language for communication about the subject area, with most of this occurring in the knowledge process of Conceptualising by Naming. Further, when analysing the learning sequence, it was discovered that a quarter of the activities prior to this ‘Round Robin’ activity, specifically commented on by Rob, involved Conceptualising by Naming. For Rob, this appeared to make a difference to his understanding of group and class discussions. Rob’s response data also showed that his use of subject specific language was above the cohort median, with his journal entries incorporating terms such as salinity and turbidity. This indicated that the language of the subject area had become a part of his repertoire. Interestingly, many of the activities in the learning sequence involved practical activities such as experiments so that the language was being used and reinforced in meaningful contexts, as advocated by Gee (2006).

However, the acquisition of the specialist vocabulary of the subject area alone did not sufficiently account for this change in Rob’s performance. Examining Rob’s response data, it was noted that he scored above the cohort median for references to the explicitness of the learning activities. When cross-referenced with learning element A, it was discovered that approximately eighty-five percent of the activities in this learning element incorporated explicit instruction and articulation of learning goals. In his learning journal, Rob described
the explicit nature of the teaching in this learning element, especially in relation to language teaching:

I learned how to set out your page when you’re writing. And you stay on one subject in a paragraph. I learned how to make an argument and stay with it… It taught me how to argue and I wanted to argue myself… It helped me by how you stay on a subject and don’t come off it. It helped me by the way you do it in real life and how to set it out.

To develop the students’ exposition writing skills, the teachers designed a series of learning activities involving the knowledge processes of Conceptualising by Naming and Conceptualising by Theorising. This included the teachers role-playing a debate to develop the concept of maintaining a coherent argument. They then explicitly taught the students how to write an exposition from setting it out to paragraphing. From Rob’s comments it was evident how valuable this explicit teaching was to his understanding of the genre. Rob’s learning experiences tend to support Kalantzis and Cope’s (2005) contention that “ironically, in some respects outsiders to the mainstream literacy game may find the traditional formal literacy curriculum preferable because it is explicit about rules – what a particular unfamiliar but powerful form of language does, and the generic devices it uses to achieve its ends” (p.60). Although Rob had received some of this explicit language and literacy instruction in the early years of schooling, he needed this to continue as he grappled with the demands of more complex academic discourse.

Further supporting Rob in acquiring the language of the subject area was the collaborative nature of many of the activities in the learning element. Within this small group context he was able to practise his language and literacy skills, and to build his academic confidence. During these activities, he had opportunities to use the language for more complex knowledge processes to analyse information and to problem solve. For example, in an Applying Creatively activity Rob was able to apply the knowledge he had gained to a local problem:

Villains – Helping Close to Home

With what has been learnt so far – how can we apply that knowledge to a local problem?
Revisit local pond discussions from catchment work. Apply that knowledge and understanding to design an action management plan that can be presented to the class and council (Learning element A, 2007, p.20).

In another of these types of activities, Rob was involved in analysing the environmental data to determine the villain in the environmental mystery. He then needed to write an accusation with supporting evidence for their choice of villain as illustrated by the following extract from Rob’s accusation:

I think it’s fertiliser because they used it on the golf course and it can go off in run off. We took off others because we did more research with water temperature and it is not good. We all thought it was fine.

For although Rob experienced difficulty with the language and literacy demands of the subject area, he still enjoyed the challenge of solving the different components of the mystery, with Rob revealing in his learning journal:

I feel happy and nervous. This is very fun. It is hard working out the crime site. I think it is Hexham Swamp and Black Bittern. This program has helped me realise the importance of the wetlands.

Rob’s enjoyment of a challenge and trying to solve difficult problems was also reflected in his response data as Rob recorded above the cohort median for intellectual challenge. He wrote favourably about his experiences with collaborative activities, describing how he had undertaken different responsibilities in the group including “ideas man” and scribe. This was significant as in these roles, Rob was working outside his comfort zone, tackling roles that he found challenging, with Rob writing in his learning journal, “I put in all my ideas and did my scribe as good as I could.” His descriptions of the group dynamics within his group revealed a cooperative spirit with group members supporting and assisting each other. Rob commented, “we all listened and let each other have a go.” For Rob, this appears to have provided a supportive working environment even though he did candidly confess that they needed to talk a little less in order to be even more productive.

Through this learning element, Rob had tasted academic success by being able to successfully complete set activities impacting on his confidence and self-perception as a learner. This
became evident to his teacher and his parents when at the end of the learning element, Rob and his intimate group of friends initiated a holiday project on the music group Metallica for an upcoming Arts learning element. The boys learnt that their teacher had little knowledge of this type of music so they decided to complete a research project on the rock group to share with the four classes in their learning area. These students found literacy based activities challenging but they knew their teachers and peers would value their contributions to the new learning element. The boys spent considerable time and effort on the project meeting at each other’s homes during the holidays to work on it. They used knowledge that they had gained during the previous learning element on audience as they carefully considered the language to use in their research report. Their parents were caught by surprise, having become accustomed to the boys playing computer games together in the holidays, to find them spending hours on the computer researching a project for school. They were also impressed with their efforts. Once school resumed the boys spent time with each of the four classes presenting an oral report on their research. They had become the experts on Metallica, making a valuable contribution to the work on comparing and contrasting different styles of music.

Through the environmental education learning element, learning had become rewarding for both Rob and Marie. The explicit nature of the learning activities helped them to develop a clearer understanding of expectations and learning goals as well as supporting them to develop the academic language for effective oral and written communication about the subject area. This enabled them to participate more fully in activities involving complex knowledge processes such as analysing the function of different elements in the environment or critically analysing the impact of different human activities on ecosystems. For both Marie and Rob, the result was a deeper engagement with the learning, creating a sense of personal connection with the learning and a genuine sense of achievement.

6.1.4 Risk Minimisers

In many ways, risk minimisers are similar to capable operators in that they are on the whole cooperative, compliant learners that do not exhibit disruptive behaviours of any kind. In fact, their behaviour is quite the opposite, seeking to draw as little attention to themselves as possible. They display an interest in learning activities and are able to complete set tasks independently. They often perform quite well in traditionally school-valued areas of the curriculum such as language and literacy activities. In the context of traditional schools, they may have been considered to be quiet achievers. Within these contexts, their behaviour and performance would have been considered exemplary, raising little cause for concern.
However, within the context of the rapidly changing social and cultural environments of contemporary schools and workplaces, concerns arise as to the ability of these risk minimisers to fully participate in these new collaborative environments. In the work of Jenkins et al. (2006), they describe the participatory cultures of the online environments used by many young people that in many ways reflect the changes in the knowledge environment of contemporary schools and workplaces. They define these participatory cultures as:

… a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one’s creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions matter and feel some degree of social connection with one another (at the least they care what other people think about what they have created) (Jenkins et al., 2006, p.3).

The concern raised by Jenkins is that access to these participatory cultures can act as a new type of hidden curriculum that can impact on academic performance and future workforce participation. Similarly, in Yon’s (2000) exploration of identity in the new global environment that is marked by increased possibilities as well as exclusion based on racial and ethnic affiliations, more subtle exclusions can occur in new cultural and social environments based on personal dispositions and experiences.

For Rose and Mandy, representing the risk minimisers in the Students Learning by Design study, difficulties may arise simply from their success as autonomous learners, perceiving little need for collaboration. Also their tendency to avoid drawing attention to themselves and their reluctance to assert their perspectives on issues may limit their participation in these new participatory environments. To operate effectively in these new participatory cultures they may need to work outside their comfort zones, their areas of proven success, and to explore new forms of expression and participation, sharing their knowledge more openly and with a wider audience. At the same time, they may need to re-evaluate their existing skills and talents in the light of this new environment where previously unrecognised talents have increased value, perhaps discovering that their artistic skills have increased currency in new multimodal environments. However, with their reluctance to take risks they may need greater direction and support to explore these new possibilities.
As with the critical consumers in the study, although the two focus students in this case are girls, within the wider research cohort for the study, boys were also represented in the risk minimiser category. Just like Rose and Mandy, they did not overly draw attention to themselves and, in some cases, were a little anxious about working outside of their comfort zone. For example, Roy in writing about the debate in his learning journal revealed, “I did not speak because I was scared.” In working with his friendship group, he felt more comfortable noting:

We liked to work in our group. When me and my friends work in a group, we hear each other’s ideas and get lots of ideas. We work well because we play with each other so we know each other well and we measure up to each other’s strengths.

Later, in working on a collaborative activity with people outside his immediate friendship group, he expressed a sense of relief when “everyone was respectful to everyone, which was helpful because no one’s feelings got hurt.” The collaborative skills program within the environmental education learning element supported Roy with his participation in group work activities encouraging him to contribute his ideas to the group.

For these risk minimisers, supportive structures that allow for safe exploration of new concepts, skills and modes of expression, and that encourage active participation in activities outside their comfort zones and proven areas of success are important. In this way, they will be prepared for the participatory cultures of new social spaces rather than facing exclusion from these spaces based on personal dispositions that are more cautious and less assertive in presenting their ideas and perspectives.

6.1.4.1 Rose

Eleven-year-old Rose was keen to avoid the spotlight, declaring, “I hate doing stuff in front of an audience.” In conversation she added that she felt she was not good at speaking and reading in front of large groups. Yet at the same time, she averred that she enjoyed drama and collaborative activities, stating, “One thing that I like is drama, even though I hate doing stuff in front of an audience.” This apparent contradiction indicated that Rose’s reluctance to appear in the spotlight was accompanied by a strong desire to explore different modes of expression and group participation. However, she could be considered to be risk averse,
wanting to minimise the feelings of exposure associated with performing in front of a larger audience and seeking some guidance as to how to participate successfully in these activities.

In discussing the motivating and learning enhancing features of computer games, Gee (2006) refers to the lowered risk of failure inherent in many of these games where players can experiment with different possibilities during the learning process and work in collaboration with other players to solve problems. From Rose’s comments, it was evident that she was seeking a risk management strategy that would enable her to experiment with different modes and mediums for expression. Initially, she was concerned that the learning element would be “a bit babyish” especially as she was already a proficient reader and writer, using complex sentences with conjunctives, appropriate punctuation and, on the whole, accurate spelling even with less common words. However, when she discovered that they would be exploring different modes and mediums in creating their own fairytales, she admitted to being excited about the learning element:

One of the things I am looking forward to is dress-up day, watching and comparing movies and at the end doing a performance... Now that I know the things we will be doing it doesn’t sound that babyish, it sounds quite exciting.

The difficulty for Rose lay in her reluctance to perform in front of a larger audience even if it only involved reading aloud in front of the class.

Although learning element B included many collaborative and knowledge sharing activities that Rose enjoyed, “just to see the different ideas people have,” learning element B did not include a component to explicitly teach the students specific collaborative skills to support their endeavours. From the students in research cohort A, we learnt that effective collaborative activities build in a clear purpose for collaboration and are often characterised by knowledge complexity and intellectual challenge, and also incorporate accountability mechanisms that promote mutual responsibility and knowledge sharing. In these activities personal expertise, experiences and perspectives are not only respected but also valued for the contribution they make to the learning of the group as a whole. In learning element A, specific structures were put in place to facilitate effective collaboration, including mechanisms for students to self monitor the group’s cooperative work skills with students using a jointly constructed social skills rubric to monitor their group’s performance at the end of
collaborative activities. In many ways, these supportive structures are those advocated by Monalisa et al (2008) for global design teams, noting that:

Trust and accountability are the cure for the fears and risks that come with meaningful communication and commitment. Trust means confidence in team leadership and vision. When trust prevails, team members are more willing to undertake a difficult process, as they will feel supported through ups and downs, risks and potential losses (p.49).

If these types of structures had also been included in learning element B, it may have enhanced the effectiveness of collaborative activities and supported Rose’s participation in these activities, with explicitly articulated values of respectful listening and constructive feedback providing a positive shared basis for group operation.

When tracking back from learning element B to one of the activities that Rose highlighted as one she particularly disliked, it was discovered that it was the Experiencing the New knowledge process. On further examination, it was revealed that in learning element B the percentage of activities in the knowledge process of Experiencing the New that involved collaboration was relatively low at twenty percent and there was a lack of explicitness and personal connection to the learning. In the design, the direction to the students reads, “participate in readers’ theatre” (Learning element B, 2007, p.10). Unfortunately, Rose required greater scaffolding to participate comfortably in this activity as this new experience was outside of her comfort zone, with Rose declaring ‘Readers’ Theatre’ to be her least favourite activity in the learning element. Rose needed more explicit guidance as to how to approach this activity with her group. Some form of accountability mechanism ensuring equal participation and responsibility for the completion of the activity may also have been beneficial. Some presentation suggestions as well as audience participation guidelines may have been reassuring for Rose who admitted feeling uncomfortable about these types of performances in front of large groups. This activity was an opportunity to expose Rose to new skills associated with participatory cultures such as taking on different identities for the purposes of exploration and improvisation that may have assisted her in managing the risk of performance in front of a larger audience (Jenkins et al. 2006). A guided personal reflection activity at the end of the task may also have supported Rose to see the value of engaging in activities outside her comfort zone, linking the activity back to learning goals.
Engaging in new experiences is essentially an exploratory process involving first draft ideas. The sharing of these emerging ideas can help to refine individual understandings based on exchange with group members. This exchange is also particularly important in the analysing knowledge processes, which can be considered to be intellectually more demanding. It was noted that in these analysing knowledge processes the level of explicitness and personal connection was again lower in learning element B than in the other learning elements in the study. For example, the student directions for one of the Analysing Critically activities from the learning element read as follows:

In groups, your role is to participate in a debate. Your topic is ‘Is the traditional purpose and meaning of the Cinderella story lost when it has been written in a modern version?’ (Learning element B, 2007, p.13)

With these analysing activities, Rose as well as her fellow group members may have benefited from a clearer focus for their discussions with some supplementary guiding questions to direct their explorations of the topic. The inclusion of a small group activity such as a ‘Think, Pair, Share, Four’ prior to the debate may have supported Rose to participate more comfortably in a whole class debate. This would have provided Rose with the opportunity to try out her ideas in a more secure small group context, first receiving feedback on her ideas from this small group of peers and enabling her to refine her ideas before the debate. It would also have given Rose the opportunity to express her personal perspectives even if she later found she didn’t have the opportunity to contribute many ideas to the whole class debate. This would have been important for Rose, as from her response data it was discovered that she scored well below the cohort median for personal connection to the learning. As argued by Kuusinen (2004) in her work on contemporary workplaces, if your ideas are not valued within the school setting, then in future you are likely to keep these ideas and perspectives to yourself.

For Rose, the opportunity to try out her ideas in a small group setting would have been valuable, giving her greater confidence to participate in whole class discussions about the stories read and the films viewed. Without this structured opportunity to effectively explore her ideas in a small group context, Rose tended to remain in her comfort zone, working autonomously and sharing her ideas in writing, participating reluctantly in activities with a larger audience. In describing her participation in an assigned group work project, Rose’s uncertainty as to how to operate in this collaborative context is evident:
We got put in groups and I was the leader type person. We all got our own job, out of anchors, weather, finance, sport and Hollywood. We have to finish our stories then by the end of the week we should hopefully get to film all 4 groups doing the news.

Although it was a group work assignment, the students in Rose’s group were essentially engaged in autonomous activities without an established structure for sharing and feedback. This tendency to work independently was reflected in Rose’s performance data, with her performance remaining unchanged across the eight knowledge processes from her assessment at the beginning of the year when she was performing solidly at an autonomous competence level.

Although the learning element successfully engaged the critical consumers and capable operators in research cohort B that thrived on greater agency in their learning and although Rose enjoyed aspects of the learning element, Rose required more explicit direction in exploring new knowledge and skills. Incorporating some additional scaffolds into the learning design would have supported this risk minimiser to engage more fully with new experiences and with a wider audience, and to make greater personal connections to the learning. In some ways, this was an opportunity missed for both Rose and her peers. Rose’s language and literacy skills, her insightful ideas and her interests in visual arts and drama would have contributed significantly to the learning of the cohort as a whole. While for Rose, moving out of her comfort zone to further explore her interests in art and drama would have made her learning experiences more meaningful and transformative.

6.1.4.2 Mandy

Unlike Rose, Mandy did not deliberately shun the spotlight but rather her mode of operation in the classroom was unobtrusive. Much of her engagement with the learning was internally focussed, with Mandy revealing how she creates pictures in her head when she is reading, preferring these self-created images to those presented in movies. Accompanying this imaginative activity was deep reflection on the subject matter, with Mandy describing how she ponders about:

Why the fairytales could be made. Why someone would say or do that. Like why did the girl hit the toad? Why did the owl only hoot just when she died and not every night? I’m still trying to work that one out.
Mandy had a desire to understand why characters behaved in particular ways and what their actions signified. She engaged in problem solving about the texts that she read, listened and viewed. With a more explicit framework for knowledge sharing for activities in the *Experiencing the New* knowledge process in this learning element, some of these reflections may have been explored further and shared with her peers. In this way, Mandy would have been encouraged to elaborate on her ideas and she would have been exposed to alternate perspectives on the narratives, enriching the learning of the group as a whole. Building on these reflections, Mandy may then have been drawn to engage openly in more intellectually demanding reflections in the analysing knowledge processes as in her response data she scored well below the cohort median for intellectual challenge. From Mandy’s perspective, the work in the learning element did not present a sufficient intellectual challenge for her.

Mandy, like Rose, was a capable writer, producing lengthy and involved narratives. This included a work sample of a narrative with paragraphs, appropriate punctuation and few spelling errors despite her self-perception that she was not a good speller. As Mandy was already skilled in the written mode, to increase the intellectual challenge of the learning for Mandy she may have been encouraged to explore how “meaning is realised differently in different modes” (Kress, 2003, p.170). With Mandy’s fascination with the imagery in the fairytales and her love of art, she could have explored how existing narratives could be worked upon and innovated on leading to the creation of new and interesting products to be shared with an audience. In the *Applying Creatively* culminating activity the students were provided with the following instructions:

> In the same small group, your role is to present your Fairy Tale in a mode of your choice. Some examples may include video, play, readers’ theatre, audio book, film strip, art work (Learning element B, 2007, p.16).

Although the intent behind this activity was to provide students with the opportunity to explore different modalities, with students being given a free choice of mode of expression, more direction may have been needed to encourage students such as Mandy to explore alternate modalities for expressing their ideas. Some workshop activities on these different modes of expression prior to this applying activity may have encouraged Mandy and her group to experiment more with these different modalities, for Mandy, like Rose, was not a natural risk taker. As Warner (2006) contends “some young people are into taking risks and
trying new activities in a big way, but many need encouragement and opportunities created for them” (p. 56). Importantly, he links this risk taking behaviour to the development of innovative tendencies in young people, something that is valued by contemporary knowledge based workplaces.

Mandy had been identified as a capable learner at the beginning of the year performing consistently at an autonomous competence level across the eight knowledge processes. However, like Rose there was no change in performance at the end of the year. With Mandy, there was almost a sense that the agency craved by critical consumers needed to be balanced with greater direction to lead her to explore more challenging possibilities within the framework of the learning element. It was evident that Mandy was interested in different modalities, making comparisons between the written story as well as cartoon and movie versions of Sleeping Beauty, and willingly experimenting with different types of illustrations, with Mandy relating, “we learnt how to draw with lead and make it look realistic.” However, this needed to be within a supportive framework that reduced the risk in exploring these different modes of expression as well as actively promoted this type of experimentation.

Both Rose and Mandy have great potential for innovation and creativity with their language and literacy skills as well as their interests in visual and performing arts. However, without the skills and confidence to effectively work within new participatory cultures this potential may go unrealised. Although innovation and creativity generally flourish in an environment with greater personal agency, a clear sense of direction facilitates the channelling of this innovation and creativity in productive ways. Both Rose and Mandy needed more guidance to channel their endeavours into unchartered waters where, with a little more scaffolding, genuine transformative learning could occur. In many ways, when given a choice it is not surprising that some students will opt for the familiar option that in the past has proven successful. Unfortunately, that was the case with Rose and Mandy who did not fully explore the potential of other modalities, staying mainly with their preferred expressive modes, posing little intellectual challenge or risk, and resulting in no change in performance. The cases of Rose and Mandy are important in alerting us to the importance of achieving a balance in our learning designs between explicit direction and student agency, with some students requiring greater direction to explore new knowledge and skills.
6.1.5 Fledgling Learners

The fledgling learners in the *Students Learning by Design* study were just embarking on their formal education. These students did not have an established relationship to schools unlike the young people described by Kenway and Bullen (2005) who had become jaded with their formal schooling experiences, expressing dissatisfaction and disengagement. On the contrary, these students were enthusiastic and eager to share new experiences with their peers. They had few preconceived notions about the journey ahead other than that they expected to learn to read and write. The students in the study also did not have any point of comparison with other types of formal learning other than *Learning by Design*, as their first encounters with formal schooling were in a classroom using the *Learning by Design* framework with a teacher experienced in using the framework.

However, this did not mean that the students were a blank canvass, all starting with the same knowledge and experiences. On the contrary, this was a diverse group of learners with varying informal learning experiences acquired in a range of lifeworld contexts. This was evident in the reading assessment conducted by their teacher at the beginning of the year, with the graph in chapter 5 showing the wide range in early literacy knowledge among the cohort. Cazden (2006) also cautions against assumptions that all children share the same knowledge of popular culture, noting that “items from popular culture (music, TV, films) are frequently recommended as a resource for heightening the lesson’s “relevance” and “significance,” but those very resources will be unhelpful, and may even to contribute to a feeling of not “belonging,” for those students to whom they are unfamiliar” (p.21). With the explosion in different forms of media producing cultural products that compete for children’s attention, it is no longer possible to assume that children share a knowledge of traditional cultural products such as fairytales and nursery rhymes.

With a teacher skilled in using the *Learning by Design* framework as well as knowledgeable about the theoretical underpinnings of the framework, the starting point for these students was clear. The teacher chose a learning element focussed on friendships and the development of social skills that could be closely linked to both the students’ lifeworld experiences as well as their new experiences in the school setting. Although David and Kate, representing the fledgling students in the study, engaged differently with the learning according to their individual dispositions, both enjoyed positive early learning experiences.
6.1.5.1 David

As one of the youngest students in the class, the teacher was initially concerned about how David would settle into this formal learning setting. He was also very much a beginning reader with the teacher recognising that at first he would require additional support with literacy activities. Therefore, activities such as the following *Experiencing the New* activity were important for building up David’s knowledge of texts:

Using the big book “The Rainbow Fish,” conduct a detailed book orientation. Peruse the text focussing on the pictures only. Look at the characters expressions, body language etc. Ask the students ‘What is happening?’ Predict the outcome. Read the story through. Children act as text participants and partake in a personal response to the story. Students write, draw, create a model or make up a play responding to the friendship issues raised in the story. Collate these responses and produce a multimedia class mind map replacing the role-play activities etc with photos for the display (Learning element C, 2007, p.10).

These types of experiences provided David with valuable opportunities to engage with texts, building understandings about how messages are conveyed through both the text and the illustrations. The activities were also involving David with the text, encouraging him to provide a personal response to the story and the messages about friendship conveyed in the text.

Despite being younger than many of the other students, David demonstrated an ability to concentrate on tasks as well as a quiet assertiveness in interacting with others. When working at his table, he quietly focussed on the task at hand. Sometimes, he would fall a step behind the others and require individual assistance but he would persevere until the task was complete. In many ways, this quiet hard-working attitude resembled the way in which Rob, one of the unrewarded workers, approached learning in the classroom. Fortunately for David, the friendship learning element incorporated many of the same features that supported Rob to experience academic success. Explicitness as well as knowledge sharing and collaboration featured significantly across the eight knowledge processes. This explicitness in the conceptualising knowledge processes further supported David with his early language and literacy development, with the teacher providing specific strategies for both reading and writing new words. Learning activities were carefully scaffolded with the teacher modelling responses, providing sentence starters and incorporating visual response options so that all the
students could successfully complete the set activities. For example, in a learning activity involving Conceptualising by Theorising the children worked in pairs on “What If” stories, using a supportive children’s computer program to create their own stories for publication in a shared big book.

David willingly accepted help from his peers as well as the teacher and made use of resources around the room such as number, alphabet and word charts to assist with completing activities. This was evident in his work samples where he both copied text available around the room but also used some of the strategies suggested by the teacher such as counting out the words in a sentence and sounding out words. David appeared to particularly value the support of peers with his work. In describing a good friend in a scaffolded writing activity he wrote:

She is a very good friend because she always helps me. She is a very kind and considerate girl. She helps everyone.

During Analysing Critically and Analysing Functionally activities, the importance of friends and friendly behaviour towards others were explored. For example, in the following Analysing Critically activity the students examined the issue of friendship through the “Rainbow Fish” story:

Reread the story of The Rainbow Fish. Analyse the story discussing who gains in the story; who loses? Would the Rainbow Fish have lost out if he hadn’t shared his scales? Think Pair Share using De Bono’s Six Thinking Hats to discuss the consequences of sharing the scales. Discuss who benefits when we’re friendly to others? What happens to someone if we’re not friendly etc. Report back to the class (Learning element C, 2007, p.12).

Through these types of activities, David had become accustomed to talking about feelings and analysing behaviours so when he was confronted with behaviours that were unhelpful, he was able to confidently assert his learning needs. He was observed telling others to stop behaviours that he found distracting. In this context, he was noted using the language of the learning element to explain his feelings.
The friendship learning element taught David some valuable collaborative work skills including the ability to monitor and evaluate his own behaviours. For example, David completed a friendship rubric in which he identified that he sometimes helped himself and others to learn with a visual example of this type of behaviour. These collaborative skills combined with his focussed attitude to learning should ensure his future success. However, as learnt from Rob’s experiences, it is important that David’s learning activities continue to feature explicit language and literacy instruction to consolidate this positive start.

6.1.5.2 Kate

Like David, this was Kate’s first year of schooling. However, she was a little bit older and had already acquired some early literacy skills. In the classroom setting, she exuded enthusiasm and confidence. From the start, Kate appeared to be a capable operator. She had a sense of the types of behaviours and learning that is generally valued in the school setting, accepting the many adult imposed controls and rituals that are a part of school culture such as appropriate listening behaviours (Schilling, 1993;Valentine, 2001). Academically, Kate expressed confidence in her abilities including considering herself to be a good writer “cause I’ve had a lot of practice.” She was observed engaging with a variety of texts in the classroom as well as participating in whole class and small group literacy activities, working both independently and with teacher or peer support.

Activities such as the following Experiencing the Known activity provided Kate with the opportunity to draw on her knowledge and skills to complete the activity and to share her ideas with others:

What does a good friend look like?
Have a look at the card you are holding. Find the other people who have a matching card. Together, paste your picture in the centre of the piece of paper. Have a look at your picture. What is your picture telling you? What does your character’s face look like? How might they be feeling? Around the outside of your picture, draw or write what you think a good friend might be. What do they look like? What facial expressions might they have?
Choose someone in your group to report back to the class. I will record your ideas on our concept map (Learning element C, 2007, p.9).
This activity suited Kate’s working style, which could be considered to be collaborative even when working on individual activities, there was a fair amount of interaction while the work was being completed. It also allowed Kate to use her writing skills while helping others. These observations of Kate’s working style were consistent with her own assessment, rating herself as always helping herself and others to learn. As a personal strength, Kate wrote:

I look after other people. I show this by helping people when they are stuck.

Rather than seeking help from others, she tended to prefer helping and looking after others. The high level of knowledge sharing and collaboration as well as interactivity featured in the friendship learning element across the eight knowledge processes suited Kate’s learning preferences.

Such as for all the capable operators, the question could be asked as to what Learning by Design had to offer Kate who already appeared to be thriving in the school setting. Similarly to the unrewarded workers in the study, lifeworld connections between home and school seemed especially important to Kate. Unlike many of the other students who focussed on their own participation in the assembly, Kate made particular mention of her mother’s attendance at the school assembly as an aspect that she enjoyed about the experience. She also observed in her reflections, “we all liked seeing our mums smiling.” Kate’s work samples reveal strong personal connections with the learning as well as engagement. This is unsurprising as all of the learning activities in this learning element were designed to support the linking of personal experiences and understandings to the learning. The learning element actively promoted a strong sense of belonging, making the learning meaningful to the students and linking their lifeworlds with their new experiences in the school context. This included linking a Conceptualising by Naming activity on caring, compassion and inclusion to the things that they did at home for their pets, with Kate showing that she cared for her bird by feeding him. For this capable operator, despite her natural ease in this new setting, the connection between her lifeworld experiences in the home and school were important, providing a sense of continuity between the two.

For both David and Kate, Learning by Design had provided a positive start to their formal learning journeys. As expected, they were being supported to become readers and writers but also their existing understandings of other modalities were built on and harnessed in learning activities in line with Luke’s (2003) assertion that “multimodal readings and experiences of
the world begin in infancy and constitute the social practices in everyday life” (p.398). In the classroom, this was reflected in the variety of forms of expression open to the children in communicating their understandings. Through *Learning by Design* they were becoming collaborative, innovative and creative thinkers and communicators as they explored new ways of knowing and expressing their understandings. As advocated by Darling-Hammond (2006), such a “thinking education” will support these new learners to develop the skills to effectively compete in new global marketplaces where intellectual skills are highly prized.

Overall for the learners in this study with their different dispositions and lifeworld experiences, the demanding contemporary world of knowledge work should be a relatively comfortable and familiar place as through working with learning elements designed using the *Learning by Design* framework they have become increasingly skilled at working with knowledge in different ways. They will be more accustomed than their industrial era counterparts to working collaboratively with their colleagues on shared goals. With these colleagues they will share the language and concepts of that knowledge community, and will be skilled in contributing their personal expertise to the group endeavour. These learners will use their well-honed social skills to work with varying teams, unafraid to share emerging ideas and open to the contributions of others with divergent perspectives. They will be more comfortable with changing teams and employers with their loyalties focussed on their personal careers and transient projects rather than on long-term commitments to one company. They will be less likely to miss a close attachment to a single company or physical workplace as their attachments will be to the project and team they are currently working with on the achievement of set targets. Their work satisfaction will be linked more closely to the challenges associated with the successful completion of the project. These knowledge era citizens will have multiple associations and personal networks extending beyond national boundaries with their participation in other contemporary social spaces overlapping at times with their workplace endeavours. These learners will be the workers and citizens of the future competing in the global marketplace and living in increasingly technologically mediated socio-cultural environments.
Chapter 7

Lessons Learnt

In this final chapter, the findings of the Students Learning by Design study are drawn together, examining the implications of this research for students, teachers and education systems. The types of learning occurring in classrooms using the Learning by Design planning framework are described in terms of the two key conditions of learning, belonging and transformation, as defined in the theory underpinning the Learning by Design approach to teaching and learning. The impact of Learning by Design is assessed in terms of the outcomes of this approach to learning for students, highlighting both academic achievement and engagement with the learning. The roles of the teacher and student in the learning process are defined and the implications of these changing roles are explored in terms of classroom practice as well as system policy. Finally, this chapter addresses the new learning hypothesis that Learning by Design meets the needs of 21st century students in knowledge societies, drawing links between student learning and contemporary workplace practices as well as new and evolving forms of community participation.

7.1 The Nature of New Learning

In the literature on new learning, much of the discussion revolved around how to engage the subjectivities of contemporary students in an era of increasing diversification and ever-changing technologies (Luke, 2003; Burbules, 2004; Gee, 2004, 2006; Kalantzis & Cope, 2005; Knobel & Lankshear, 2006). Concern was expressed about student alienation and its impact on students’ academic performance and engagement with learning (Carspecken, 2002; Frydenberg et al., 2005; Kenway & Bullen, 2005; Thomson & de Bortoli, 2008). These concerns were accompanied by an awareness of the socio-cultural changes that were impacting on the wider society, including contemporary workplaces with research on these changes occurring concurrently with the research on new learning and in some cases overlapping with this research.

From this body of research and debate about the rapidly changing technological and socio-cultural environment in contemporary knowledge societies emerged different perspectives on the nature of new learning including Learning by Design (Kalantzis & Cope, 2005). The
Students Learning by Design study set out to explore how this particular approach to new learning for new times, Learning by Design, translated into classroom practice and its impact on student learning. The findings of the study in relation to the types of learning occurring in classrooms using Learning by Design and the outcomes of this learning are categorised according to the two key conditions of learning underpinning this theory, belonging and transformation.

7.1.1 Belonging

By identifying belonging as a key condition of learning, Learning by Design theory directly confronts the issue of student alienation and disengagement. However, it is a different sort of belonging to that associated with traditional schooling that emphasised identification with the schools and compliance with its rules and values (Schilling, 1993; Valentine; 2001). Belonging, in the Learning by Design sense, is a belonging to the learning itself for “belonging occurs where formal learning engages with the learner’s experiential world (lifeworld)” (Kalantzis & Cope, 2005, p.37).

Initially, it was presumed that this sense of belonging was largely achieved through activities in the Experiencing the Known knowledge process; however, the research study revealed that the process of creating this key condition of learning was more complex. The more experienced users of the Learning by Design planning framework developed designs where personal connections to the learning permeated the learning elements. Through often simple and subtle pedagogical moves, the teachers provided opportunities in learning activities across the eight knowledge processes for the students to make personal links to the learning. For example, the students were encouraged to make written, oral or pictorial personal responses to learning activities. These learning designs addressed student diversity by actively encouraging students to make links between the learning and their lifeworlds with cultural and lifeworld expertise considered to reside with the students rather than the teachers. The students retained control of their expert knowledge, making choices about how and when it was deployed in the learning context while the teacher provided opportunities for the sharing of this expertise through the learning designs. In this way, learning became a personal and meaningful experience that recognised and valued the contributions of all learners.

As these components of the learning activity could at times be considered to be peripheral to the main focus of the learning activity, they could often go unnoticed and unrecorded in conventional programming documents although Lingard (2007) in discussing the detailed
observational research conducted for the Queensland School Reform Longitudinal Study noted “we were also surprised how unconnected with students’ lives and communities that the pedagogies were most of the time” (p.258). This would indicate that these pedagogical choices are not automatically a part of all teachers’ repertoires. In the light of this observation, the recording of these pedagogical choices can be considered to be particularly important, highlighting a variable that can impact on belonging. This was the case with the teachers in the study using the *Learning by Design* planning framework revealing that the students in the classes where these pedagogies were deployed throughout the learning element recorded greater median scores for personal connection to the learning. As noted by one of the ‘critical consumers’ in the study “…on this one you got to say what you thought rather than doing it as a whole class.”

The *Experiencing the New* knowledge process also appeared to contribute to learner belonging in the learning. In the learning elements in the study, it was found that teachers used this knowledge process more often than *Experiencing the Known* with the percentage of *Experiencing the New* activities at least double the percentage of *Experiencing the Known* activities in all three learning elements. Although it was initially assumed that the *Experiencing the Known* knowledge process connected learners to new learning, the motivating power of new experiences in generating a shared passion for the subject matter became evident through the students’ response data. These new experiences created motivating shared experiences as a basis for further learning. In essence, this knowledge process ensured the teacher designers that the students shared a common starting point for the activities following this knowledge process.

Unexpectedly, the knowledge processes of *Conceptualising by Naming* and *Conceptualising by Theorising* also proved to play a significant role in generating a sense of belonging in the learning. The initial clue directing the research along this line of enquiry was again provided by one of the ‘critical consumers’ in the study who reflected:

> If we hadn’t done all this work before we wouldn’t have understood what he was talking about at the wetlands. But now I understand all the words and what he was talking about, about fertilisers and things.

Through these knowledge processes, his teacher was building a shared language for communication about the subject. This shared language not only enabled the students to
effectively communicate with each other but also with outside experts such as the ranger from the wetlands. This shared language facilitated activities under the other knowledge processes such as the intellectually demanding activities in the analysing knowledge processes. Without this shared language, many students would have been effectively excluded from the learning process as the language and concepts of the subject area were outside their lifeworld experiences. For these students to belong in the learning, the teaching of this language needed to be included in the learning design. Along with the ‘critical consumers,’ the building of this shared language impacted particularly on the ‘unrewarded workers’ in the study who in the past could be considered to be under-performers. This finding is consistent with Gee’s (2004, 2006) contention that much of school success is dependent upon an understanding of academic language. It is interesting to note that in this complex process, belonging was created through transformation. By learning the language and concepts of the subject area, this discipline knowledge became a part of their personal knowledge that then further connected them with new learning about the subject.

Underpinning Learning by Design theory is a subtle distinction in the definition of knowledge that may almost go unnoticed; however, it is of considerable significance in the design of learning elements and ultimately, in creating learner belonging. Knowledge encompasses “acting and meaning, as well as thinking” (Kalantzis & Cope, 2005, p.72). This view of knowledge makes learning an active and participatory process rather than a receptive activity. Translated into the Learning by Design planning framework, there is a shift in emphasis inviting teachers not only to consider what they want the students to know but how they want the students to know. In designing learning using the theory of multiliteracies and the eight knowledge processes, teachers are making deliberate decisions about how the students will learn disciplinary knowledge. The consequence of this emphasis appears to be a high level of interactivity across the three learning designs in the study. As a result, the students were more actively involved in the learning process and better able to link learning to their lifeworld experiences, generating a greater sense of belonging in the learning. Even from the perspective of a ‘capable operator,’ this interactivity was important in engaging them in the learning process:

I like how we didn’t just discuss it in class but we went and saw the land clearing near the pond. You did how you feel, what you see and what you hear, and you had to pick the victims and the villains.
Drawing the greatest complaint from students in the study were any activities that largely involved passively receiving information. This is unsurprising as Burbules (2004) identified interactivity as one of the elements that contributed to the active engagement of students in learning environments while Gee (2006) noted that interactivity was a contributing factor in the sense of ownership and agency felt by the players of computer games. The importance of interactivity was also confirmed by Frydenberg, Ainley and Russell’s (2005) examination of student engagement, finding that students favour active, experiential learning activities over more traditional passive learning activities that emphasise teacher transmission of knowledge. The more dynamic definition of knowledge underpinning the Learning by Design framework appears to promote interactive learning designs, which, in turn lead to greater student engagement with the learning.

A further consequence of this definition of knowledge, where knowledge is considered to be fluid rather than static and where learning is viewed more as an active rather than a passive process, appears to be the social nature of much of the learning in the learning elements designed using the Learning by Design framework. In the three learning elements in the study, many of the activities involved collaboration and knowledge sharing with students sharing ideas and working together to solve problems and create new knowledge products. Although the study found that students required supportive structures within the learning designs to facilitate effective knowledge sharing and collaboration, overall the students themselves highlighted the benefits of these types of activities. Interestingly, this need for support structures to facilitate knowledge sharing and collaboration was also noted in adult work environments with Kuusinen (2004), Monalisa et al (2008), and Woiceshyn and Falkenberg (2008) all highlighting the importance of workplace structures that promote this type of activity. The value of knowledge sharing and collaborative activities appeared to be greatest when the knowledge demands were also the greatest as collaboration effectively reduced the knowledge load and risk borne by individual learners and the students themselves scaffolded each other’s learning. One ‘capable operator’ in the study reflected, “I don’t think I would have been able to work it out if I was just by myself.” As noted by Woiceshyn and Falkenberg (2008), just as a worker at Google would not have to solve the problem on their own, this ‘capable operator’ working on a learning element designed using the Learning by Design framework was able to work collaboratively to solve the problem.

The Students Learning by Design study revealed that the way belonging is created through learning designs planned using the Learning by Design framework is more sophisticated than
initially anticipated with the nature of learning activities across the eight knowledge processes contributing to student belonging in the learning. Belonging was created not only through learning activities that connected directly with the students’ lifeworlds but also through transformative activities that built a shared base for further learning. The learning was designed to actively engage the students in the learning process and to facilitate their effective participation in learning activities. The more experienced designers achieved a balance between learning supports and challenges creating the other key condition of learning, transformation.

7.1.2 Transformation

The other key condition of learning identified in *Learning by Design* theory, transformation, also proved to be more complex than initially anticipated. In some of the literature as well as in some of the students’ comments, there appeared to be almost a tension between belonging and transformation. For example, the comments of the thirteen-year-old boy quoted by Rowe (2003) who was only interested in sport and military aircraft were mirrored by ‘critical consumers’ in the research that wanted to focus on maths and science or ‘BMXing’. Yet at the same time, these students in the research expressed a strong desire to learn something new and challenging. However, it was discovered that in the learning elements designed using the *Learning by Design* planning framework, the relationship between these two key conditions of learning was different. Belonging and transformation were intricately intertwined in the learning process in a mutually dependent relationship.

Just as earlier, it was noted that belonging was created through transformation as the students’ built a shared language for communication; transformation is created through belonging in the learning. In contemporary social spaces such as Gee’s (2004) affinity spaces and contemporary workplaces (Alvesson, 2001), a symbolic sense of belonging is created around shared interests, goals and practices. Within the learning context, student engagement and belonging in the learning is enhanced through explicitly articulated goals and expectations (Frydenberg et al., 2005). In the *Students Learning by Design* study, it was found that the explicit communication of shared goals and expectations did indeed contribute to the students’ sense of belonging; however, this explicitness was particularly important for learner transformation. This was especially highlighted by the ‘unrewarded workers’ who were initially under-performing. Although they appeared to have internalised the more traditional forms of school belonging including values and rules, in a sense, in the past they had been excluded from the learning process because they did not fully understand the goals and
expectations of learning tasks. The detailed articulation of learning plans in the learning elements designed using the *Learning by Design* framework translated in the classroom into the explicit articulation of learning goals and expectations by the teachers.

Although some may criticise *Learning by Design* for the work involved in the detailed planning of learning elements, it is this very detail that contributes to the efficacy of these learning designs in enhancing student performance. The construction of disciplinary knowledge is complex which includes not only the language and concepts of the discipline but also tacit understandings about the values and beliefs of the knowledge community that influence the way knowledge is used and communicated within the discipline (Brown, 2006). In the *Students Learning by Design* study, it was found that where this disciplinary knowledge was made explicit, along with the teacher’s learning goals and expectations, there was an improvement in the performance of previously under-performing students, including the ‘unrewarded workers’ and ‘critical consumers’ in the study. For these students, there was also a newfound confidence in their own abilities. Building these disciplinary understandings was effectively described by one of the ‘unrewarded workers’ as a feeling of having been “into a scientist’s head.” These students not only belonged in the learning but they were also being transformed into members of the knowledge community of the discipline.

Within the *Students Learning by Design* study a close link was evident between explicitness and intellectual challenge. The explicit disciplinary understandings developed in the conceptualising knowledge processes made it possible for the students to engage in the intellectually challenging inquiries in the analysing knowledge processes. In the design of the learning elements, the teachers did not simplify the language, concepts and tacit understandings of the discipline but rather scaffolded the students to develop these understandings through the conceptualising learning activities. This was the case even for the younger students who were in their first year of formal schooling. By building these disciplinary understandings and setting clear learning goals, the teachers were, in effect, creating learner intellectual independence, giving them greater agency over their own learning. These understandings enabled students to engage with the intellectually challenging and often more open-ended activities in the analysing knowledge processes that involved further deepening their own understandings, building new knowledge, solving complex problems and communicating their ideas.
An example of this type of challenging activity was the environmental debate that was one of the *Analysing Critically* activities in learning element A. In observing this debate, the impact of intellectually challenging activities on student engagement highlighted by Gee (2006) and Frydenberg et al. (2005) was evident with students and teachers alike so engrossed that they did not notice the passage of time and were surprised by the end of school bell. The students were reluctant to leave because they wanted to continue the debate. At the same time, the debate provided evidence of the importance of intellectual challenge to learner transformation as argued by Darling-Hammond (2006), Lingard (2007) and Ritchhart (2007) with the ideas presented during the debate challenging the students’ existing understandings and helping them to refine their ideas and perspectives. Further, this activity provided an opportunity for the students to use their disciplinary understandings in a meaningful context.

This addresses one of Gee’s (2006) concerns that students may be able to succeed at conventional pencil and paper tests but have difficulty in more complex problem solving activities that involve a sophisticated understanding of the academic discourse of the discipline. These students demonstrated that they had a greater depth of understanding of the discipline; they were able to complete conventional assessments of content knowledge, but more importantly to also complete more complex tasks involving problem solving and application of these understandings. In the case of the debate, the students were required to quickly evaluate alternate perspectives on the issue and draw on their understandings to present strong coherent counter-arguments. Following the debate, the students then prepared a personal response to the issues in the form of a written exposition. It is anticipated that future testing regimes will focus more on these challenging tasks that more closely reflect the increasingly complex and intense knowledge demands of the 21st century as employers begin to increasingly select their workers based on expert knowledge and high order thinking skills.

The conceptualising and analysing knowledge processes work closely together in developing deep disciplinary understandings. By omitting either one, there is a risk of leaving students with an incomplete, shallow or flawed understanding of the subject matter. The conceptualising learning activities provide the scaffolds that make further, more challenging intellectual inquiries possible. As the students become members of the knowledge community of the discipline with its specific epistemic context, they are empowered to work with the knowledge of the discipline. For the students in the study, the result of this in-depth engagement with the subject matter was improved learner performance, especially for the
‘critical consumers’ and ‘unrewarded workers’ while one of the ‘capable operators’ in the study commented on how interesting the learning was because “it wasn’t all a straight line”.

Although the applying knowledge processes are also intellectually challenging, their role in the learning designs could almost be considered to be that of an assessment task as they often provided evidence of student transformation. Within the learning designs in the study, many of the learning activities in the applying knowledge processes were designed in such a way as to draw together the learning from the other knowledge processes and provide an opportunity for the students to demonstrate their understandings and skills. This use of the applying knowledge processes may also explain the teachers’ greater use of the *Applying Appropriately* knowledge process to that of *Applying Creatively* across the three learning elements with the *Applying Appropriately* knowledge process providing teachers with evidence of transformation that is easier to assess and compare, linking more closely to conventional performance measures used in schools. One of the future challenges for educators will be to design assessments that make full use of activities where students are engaged in *Applying Creatively*; potentially this is where we will find evidence of important 21st century capacities for innovation, creativity and problem-solving.

The study confirmed that learning designs planned using the *Learning by Design* planning framework contributed to creating the two key conditions of learning, belonging and transformation. This was achieved through the use of multiliteracies theory along with the eight knowledge processes in the *Learning by Design* framework, resulting in a shift in focus from mainly what the students were to learn to also encompass how the students were to learn. Accompanying this emphasis on the how of learning, there was greater explicitness in the articulation of goals and expectations. It also appeared to promote more interactive and collaborative learning activities where students were engaged in complex and challenging learning tasks. However, there was also greater scaffolding of student learning through the building of subject specific language and concepts, creating a shared basis for further learning as well as for effective communication about the subject. Consequently, students were supported to succeed in a challenging knowledge environment leading to improved student engagement and performance.

### 7.2. Changing Roles

In the rapidly changing technological and socio-cultural environment of contemporary knowledge societies, it could not be expected that schooling as well as teachers and students
would remain untouched by these changes. In fact, in many ways they have been caught in the middle of the battle for the contested ground of new learning. As pointed out by Luke (2004), teachers, in particular, face increasing scrutiny during times of significant change. In practical terms, this has translated into increasing monitoring of student, teacher and school performance (Cummins, 2001; McLaren, 2005; Vickers & Singh, 2005). It has also resulted in the intensification of the work of teachers partly through increasing and more complex administrative requirements (Luke, 2004).

At the same time, the role of teachers and students in new learning has been fiercely debated with concerns expressed that corporate pedagogues may usurp the role of teachers because of the pervasive nature of contemporary consumer-media culture in children’s lives (Kenway & Bullen, 2005). While, Cummins (2001) and McLaren (2005) have expressed concerns about current testing regimes and their influence on the work of the teacher, producing pedagogies that reinforce existing power structures and exclusively serving the needs of advanced capitalist economies. Perhaps more optimistically, Featherstone (2004) included teachers in a new class of cultural intermediaries that would work to popularise the cultural capital of elite groups such as artists, making it accessible to a wider audience. Another perspective on the role of the teacher in new learning is that of a designer of learning, a perspective that restores some autonomy and professionalism to the role of the teacher.

The changing role of students is largely attributable to the clash between contemporary students’ lifeworld experiences and the nature of traditional schooling. Children accustomed to interactive on-line environments and an array of choices in leisure activities and consumer goods are no longer satisfied with the passive, receptive forms of learning typical of traditional schooling as described by Schilling (1993), Valentine (2001), and Kalantzis and Cope (2005) among others. The student alienation and disengagement associated with contemporary students working in these traditional learning environments has also been linked to the poor academic performance of students (Frydenberg et al., 2005). In efforts to reform contemporary schools and to reconceptualize learning for 21st century students it is, therefore, to be expected that the role of students as well as their teachers will be different to that of their industrial era counterparts.

7.2.1 The Teacher

In the process of exploring new learning through the use of the Learning by Design planning framework, it became apparent that the role of the teacher had changed significantly from a
knowledge authority figure directly imparting content knowledge to their students to an expert designer and manager of learning. Accompanying this new role in the learning process, there was a subtle shift in emphasis in the work of the teacher from classroom instruction to planning. However, these changes did not diminish the role of the teacher in the learning process but rather enhanced the demands on the professional expertise of the teacher.

In exploring how the two key conditions of learning, belonging and transformation, are created in learning elements, it became apparent that the levels of disciplinary and pedagogical knowledge demanded of teachers were much greater than in the past when the predominant mode of instruction was direct delivery of content knowledge. From the *Students Learning by Design* study that encompassed students from kindergarten to year 6, it was evident that a high level of expertise was required of teachers regardless of the year level of the students they were teaching. Within this primary school context, a breadth of knowledge was also required of teachers spanning a number of different disciplines. These teachers were responsible for introducing their students to the cultural worlds of scientists, authors and mathematicians among others, providing them not only with the conceptual knowledge of the discipline but also tacit understandings about how knowledge is used and communicated within that discipline. This enabled their students to work with disciplinary knowledge on more complex tasks requiring analysis and application of knowledge. The teachers themselves needed a deep understanding of the discipline so that they could deconstruct this knowledge to develop cumulative and coherent learning designs that would make this disciplinary knowledge explicit and accessible to their students. This included making explicit the appropriate use of technologies and multimodal forms of communication within the discipline.

In some ways, through the design process the teachers could also be considered to be in Featherstone’s (2004) terms cultural intermediaries drawing on their professional expertise and knowledge of curriculum guidelines to design learning that introduces students to new ideas and understandings beyond their existing lifeworld experiences. Avoiding the pitfalls outlined by Gaudelli (2003) and Cazden (2006) associated with teachers setting themselves up as cultural authorities or using popular culture as a reference point for learning, in classrooms using the *Learning by Design* planning framework the role of expert was fluid, allowing for the sharing and exploration of knowledge, and recognising and valuing the knowledge students bring with them to the classroom. Carefully scaffolding the students’ enquiries by providing them with the necessary conceptual understandings, the teachers designed activities
to prompt the students to use and think about knowledge in different ways and to make their own links to their lifeworld experiences. This approach aligns closely with that advocated by Gaudelli (2003) reflecting “…a pedagogical style that promotes critical engagement of complex, diverse information toward socially meaningful action” (p.11). A high level of teacher pedagogical expertise is required in designing learning that facilitates this type of critical enquiry that provides students with greater intellectual independence yet also demands greater student accountability for their learning as they engage in collaborative explorations of complex issues. An example of this type of enquiry was evident in the environmental education learning element that prompted students to critically examine the perspectives of farmers, developers and environmentalists as the students considered their own positions on land use in their local area.

This role of the teacher as a designer of learning often goes unrecognised with attention focussed on what occurs in the classroom with Huber (2004) noting that teachers are rarely given credit for the thinking that underpins their learning designs. This component of teachers’ work also often goes unsupported through the provision of adequate time and opportunities for professional collaboration and mentoring. Yet the learning design has a direct impact on the effectiveness of classroom teaching and ultimately on student performance. Within the classrooms in the Students Learning by Design study, the learning designs were central to the success of the learning process for the students. In comparing the learning designs, subtle variations were found in the designs developed by the experienced users of the Learning by Design framework and those developed by the teachers who were just beginning their learning journeys with Learning by Design. As noted by one of the teachers in the study as a result of more and more experienced teachers reaching retirement age, some schools are also being predominantly staffed by early career teachers so that opportunities to engage in professional mentoring and collaboration with more experienced colleagues are not always automatically available. Given that the design process is a complex one drawing on the teacher’s classroom experience, pedagogical expertise, content knowledge and understanding of the curriculum to develop cumulative and coherent learning sequences, it is important to support teachers in this process, especially early career teachers who have less classroom experience to draw on in developing their learning designs.

From the teachers in the study, we learnt that teachers just like their students need a cumulative and coherent professional learning design with time and opportunities to consolidate their understandings and to apply this new knowledge into their classroom
contexts. Without such an approach, meaningful change in classroom practices becomes difficult. More fragmented approaches to professional learning that focus on the delivery of isolated courses on specific skills or strategies leave teachers unsupported in the process of fitting these fragments together into a coherent learning design for their students. It is considered that the most effective professional development for teachers is that which brings together disciplinary knowledge with pedagogical understandings in the meaningful context of planning real learning for their students.

Both Proficient and Novice Primary Schools operate in a cluster which has allocated resources to the employment of a senior executive teacher, specifically to act as a professional mentor to support teachers in the development of quality designs using the *Learning by Design* framework. The professional mentor deliberately designs professional learning activities in such a way that they directly link to *Learning by Design* and the development, evaluation and implementation of learning elements in the cluster schools. In this way, teachers are able to concentrate their efforts on becoming skilled at producing quality designs for learning, drawing on and sharing their knowledge of the discipline and professional expertise as they collaborate with their colleagues in this process. The professional learning is both meaningful and purposeful as it links directly to the teachers’ work in the classroom. In this context, the *Learning by Design* framework serves a twofold purpose, scaffolding both the acquisition of new disciplinary understandings and the development of quality learning designs. This is achieved by providing a focus for professional dialogue and by giving teachers a pedagogical framework for their designs.

This, of course, raises the question of whether *Learning by Design* would be as successful in another environment that may be less supportive of the role of teachers as designers of learning. Within the scope of the current study, it was not possible to explore, for example, the ability of individual teachers without collegial support to successfully implement *Learning by Design* in their classrooms. However, it is suspected that without the support of their professional colleagues and the school executive the learning and implementation process would be more difficult. In fact, it is feasible to surmise that some teachers would give up, finding it too difficult to persevere on their own, especially as we have learnt from the study that challenging learning and work is best undertaken in a collaborative context. Even in the current study, it may be considered that without the dedicated professional mentor along with the support of the university research team the change process would have been slower and more difficult. Just as Luke (2004) described the intensification of teachers’ work
as a result of increasingly complex accountability requirements and school-based management, so too there has been an increase in the administrative workload of school principals and other executive staff. Therefore, school principals along with other members of their executive teams often have limited time to deploy their extensive professional expertise to the pedagogical mentoring of their staff. By having a full-time pedagogical mentor in the cluster it was possible to design a coherent approach to professional learning as well as to learning design that has, as identified in the study, yielded positive outcomes for students in terms of learner engagement and performance while providing a supportive climate for pedagogical change.

Although the teacher’s role in the classroom has changed from a knowledge authority figure imposing their understandings on their students to an expert designer and manager of learning, their overall responsibility for learning remains unchallenged. Teachers are ultimately accountable for creating learning designs aligned with systemic curriculum frameworks that support students to achieve prescribed learning goals. At the same time, these designs must capture the imagination of contemporary students, actively engaging them in the learning process, for as highlighted by Frydenberg et al. (2005) this type of engagement is closely linked to student performance. It may be argued that this active participation in the learning process develops in students deeper disciplinary understandings and a greater capacity to use this knowledge in complex, innovative and creative contexts. However, it must be recognised that the teacher deliberately creates this student agency by providing a supportive framework within which the students can explore disciplinary knowledge. The teacher’s management of the learning is exercised through the learning design, scaffolding the students’ acquisition of essential disciplinary understandings and thus, giving students the intellectual independence to further work with this knowledge in challenging contexts. These effective learning designs represent a considerable investment of time and thought by teachers to the design process. Therefore, if we expect this quality of design from our teachers with the associated rewards of improved student performance and engagement, the effort and expertise involved in creating these designs must be recognised and supported by providing teachers with time and opportunities to work collaboratively with their colleagues in the design process. For as argued by Darling-Hammond (2006), “schools have to be places that support good teaching, and the work that students are asked to do has to be work worth doing” (p.21).
7.2.2 The Student

With the changing role of the teacher, the role of students in the learning process has also changed from that of a passive recipient of knowledge to an active participant in the process of self-transformation through using, creating and sharing knowledge. From the study, we have learnt that student performance is less about innate ability and more about learning that engages the diverse subjectivities and lifeworld experiences of the learners. In fact, in some cases such as that of the ‘critical consumers’ in the study, their past under-performance could almost be considered to be an active choice on the part of the student linking closely to their disengagement from the learning. These learners were seeking a challenge and greater agency over their own learning. However, these learners along with the ‘unrewarded workers’ and the ‘risk minimisers’ also wanted a clear sense of direction and supportive scaffolds to help them achieve the learning goals set by their teachers.

In implementing the successful learning elements in the study, the teachers were able to assume a less dominating role in the classroom as they subtly managed the learning process in such a way as to create opportunities for their students to become active agents in their own acquisition and creation of knowledge. This was possible because of the well-designed learning framework that provided students with a coherent and supportive structure to work with the knowledge of the discipline. At the same time, the explicit articulation of learning goals and expectations created a subtle shift in accountability for learning from the teacher to the students, empowering the students to take responsibility for their own learning. This approach to management is consistent with that found in many contemporary workplaces where belonging centres on shared project goals (Alvesson, 2001; Kolehmainen, 2004; Kalantzis & Cope; 2005). Workers align their goals to those of the project team with all team members sharing responsibility for the achievement of project goals. This contrasts with Valentine’s (2001) description of Foucault’s ideas of self-control imposed through surveillance that actually result in resistance, an occurrence not uncommon in traditional teacher centred approaches to management. However, it is important to note that in the classroom context, it is difficult to achieve a commitment to shared goals without also providing an intellectually challenging learning program that engages the students with the learning as pointed out by one of the ‘critical consumers’ “I like things which are more challenging.”
In classrooms using the *Learning by Design* framework, the teachers still assumed the role of knowledge authority when direct instruction was required, scaffolding the learning of discipline specific knowledge, skills and conventions but more often their role was that of an expert designer and manager supporting individuals and groups within the class as they worked with this disciplinary knowledge to build their own understandings. The students organised their group work, allocated roles and even managed the social working relationships within the group. However, these collaborative activities were most effective in the classes where specific scaffolds were incorporated into the learning designs to support the students’ efforts. It was interesting to note that in research cohort A with the dedicated collaborative skills program embedded in the learning element, there was little direct engineering of group composition. For example, students were not placed into ability or mixed ability groups. Instead, they were encouraged to work with a variety of different people and to choose their main work group based on how productive they felt they could be in their chosen group. As explained by one of the students in research cohort A, “…we work well because we play with each other so we know each other well and we measure up to each other’s strengths.” The students’ learning journal entries also indicated that they were encouraged to take on different roles including roles that they may have found challenging such as being a scribe or reporter. Again, within this supportive framework that builds the students’ collaborative skills, they were given greater agency over their learning environment, which is reflected in the high median score for positive responses to collaboration and knowledge research in this research cohort.

This is the type of learner independence advocated by Ritchhart (2007) that promotes deep learning. In these classrooms, not only were the students taking responsibility for their own learning but they were also taking on the role of teaching others by sharing their knowledge and expertise. Just as workers in multidisciplinary project teams need to teach each other specialist concepts for the completion of complex projects, the students were teaching each other valuable knowledge and skills (Kolehmainen, 2004). The roles of teacher, student and expert had become fluid just as knowledge had become fluid with students accessing the knowledge they needed from a variety of available sources including outside experts to complete the set learning activities. These types of fluid roles are also consistent with the knowledge relationships found in Gee’s (2004) affinity spaces where knowledge is shared and specialist expertise is highly prized. The role of expert fluctuates according to the task and the specialist expertise required for its successful completion. In the classrooms in the study, this created a highly interactive learning environment where knowledge authority was shared with
students, teachers and outside experts engaging with each other around the knowledge of the discipline. However, this type of knowledge sharing was only possible because the teachers’ learning design had provided students with the opportunity to develop the academic language and concepts of the discipline, enabling them to communicate and work with knowledge in discipline specific ways. For Rob, an ‘unrewarded worker’, it was about working with knowledge as you would “in real life.” Rob’s sense of empowerment is evident in his comments on developing his exposition writing skills, “I learnt how to make an argument and stay with it … and I wanted to argue myself.” He had developed the necessary skills to effectively communicate his ideas and understandings about the issues using the academic discourse of the discipline.

Within classrooms using the Learning by Design framework, there was a marked change in the role of teachers and students. The teacher’s role could in some ways be equated with that of a project manager, encompassing a wide range of responsibilities and requiring a high level of professional expertise that often spanned a number of different disciplines. Their role was to clearly define goals and expectations, design realistic yet challenging work plans and organisational frameworks, access resources, promote effective working relationships, provide feedback and seek out markets or audiences for the knowledge products produced by the students such as organising the sharing of student created stories with a junior buddy class. Similarly, students were no longer passive recipients of authorised bodies of knowledge but rather they were active participants in using, evaluating, sharing and creating knowledge. They were problem-solvers, innovators and knowledge creators as advocated by Warner (2006). Through greater student agency in the learning process, diversity also became a learning asset as different perspectives and expertise were harnessed in the pursuit of shared project goals.

7.3. Workplace and Community Participation

Amongst the optimism of the possibilities afforded by technological advances for the development of increasingly participatory cultural practices both Yon (2000) and Jenkins et al (2006) sound a cautionary note observing that these very same practices can also lead to new forms of exclusion. Acknowledging the exclusionary potential of these new socio-cultural practices, it is recognised that there is the possibility that education may either reinforce this exclusionary potential or it may counter it, depending on the decisions made about what constitutes new learning for new times. Darling-Hammond (2006) links the well being of contemporary knowledge-based societies as a whole to their ability to ensure that everyone
has access to a thinking education that prepares them for not only active but productive
citizenship. This may provide the key to what constitutes effective learning for new times; it
is learning that fulfils the broader value of education in promoting active citizenship within
contemporary democracies while also preparing its citizens to successfully compete in a
changing global employment marketplace.

In exploring the original hypothesis of this study that *Learning by Design* presents a type of
new learning which addresses the issues of new times and the needs of new learners, the
classrooms in the study need to be viewed from the perspective of new social spaces and how
well they reflect the features of these spaces. Although the teachers did not deliberately set
out to teach participatory cultural or workplace competencies, the nature of the teaching and
learning in these classrooms did reflect the practices of these new social spaces. From this it is
possible to conclude that the *Learning by Design* framework with its eight knowledge
processes promotes learning that incorporates these features including personal connection
(Kalantzis & Cope, 2005; Lingard, 2007), explicitness (Alvesson, 2001; Ritchhart, 2007),
intellectual challenge (Darling-Hammond, 2006; Warner, 2006), interactivity (Burbules,
2004; Gee, 2004, 2006), shared language (Brown, 2006; Gee 2006), and collaboration and
knowledge sharing (Jenkins et al., 2006; Woiceshyn & Falkenberg, 2008).

In some ways this is unsurprising as the emphasis in contemporary workplaces with complex
and intensive knowledge demands is on mutual learning and collaborative social skills
facilitating project work involving problem solving and high levels of innovation and
creativity (Kolehmainen, 2004; Kuusinen, 2004; Woiceshyn & Falkenberg, 2008). As both
these workplaces and schools are engaged in learning and working with knowledge the same
features are present in both social environments. Further, the immersive qualities found in
virtual environments, including affinity spaces that are considered conducive to learning, are
these same features found in contemporary knowledge workplaces and classrooms using
*Learning by Design* (Burbules, 2004; Gee, 2004, 2006). Therefore, there appears to be a close
alignment in the ways that people engage in these social spaces and the ways students learn in
*Learning by Design* classrooms, supporting the hypothesis that *Learning by Design* does
indeed address the needs of new learners, preparing them for new forms of community and
workplace participation.

However, one area of concern still remains that is the systemic assessment and reporting of
learning. Current assessment regimes that focus on basic literacy and numeracy skills fail to
capture the quality and richness of the teaching and learning occurring in classrooms, especially classrooms focussing on providing a thinking education for students as advocated by Darling-Hammond (2006). Knobel and Lankshear (2006) have also observed the impact of this mismatch between teaching, learning and assessment noting that:

This can be a tension for teachers as well, when they want to support and promote students’ agency but at the same time feel bound by curricular and reporting requirements that define literacy as encoding, decoding, and comprehension of conventional texts and curriculum delivery as an orderly progression through an official program of topics and tasks (p.82).

These assessment and reporting regimes do not reflect the more complex and intellectually demanding knowledge environment of contemporary classrooms that utilise a range of technologies and multimodal forms of communication in their teaching and learning focussing on the use, creation and sharing of knowledge. From the perspective of prospective knowledge era employers that are seeking workers with a new set of workplace competencies that emphasise problem solving abilities, innovation and creativity as well as collaborative social skills facilitating mutual learning, current assessment and reporting regimes do not highlight the qualities they are looking for in their employees. When examined in this light, it may be considered that the current assessment and reporting regimes are sending a message about what constitutes valuable learning that conflicts with the values expressed by employers of knowledge workers and the teachers and students engaged in new learning. From the perspective of the ‘critical consumers’ in the study, it is also questionable whether this type of assessment and reporting will ever truly reflect their capacities with their tendency to disengage from activities that afford them limited agency and have little relevance to their lifeworlds. What is needed is an approach to assessment that captures the problem solving, innovative and creative capacities of students and their collaborative social skills, demonstrating their ability to work in the new complex and intensive knowledge environments characteristic of contemporary knowledge societies.

In recognising the broader value of education in particular in relation to the functioning of contemporary democracies and active citizenship, sometimes the role of education in preparing students for workforce participation is de-emphasised. However, the reality for many students and their parents is that education is viewed as supporting students to fulfil their aspirations. From the students in the study, it was evident that many of these students
were already canvassing career possibilities even before they had left primary school. Therefore, when considering the socio-cultural implications of new learning, the impact of *Learning by Design* in producing not only active but also productive citizens cannot be ignored. Students working in classrooms using *Learning by Design* were learning skills for new forms of community and workplace participation that place increasing social and knowledge demands on citizens and workers in contemporary knowledge societies. Ultimately, this type of learning can be considered to impact on their future well being both economically and socially preparing them for both active and productive citizenship.

### 7.4. Conclusion

Whilst recognising the limited scope of the *Students Learning by Design* research study and the need for further research in a range of different school settings, *Learning by Design* does emerge from the contested ground of new learning as an approach worthy of further consideration. The starting point for *Learning by Design* is recognition of the rapidly changing technological and socio-cultural environment in which contemporary schools operate and the need to address these changes both from the perspective of both students as well as their teachers. A strength of this approach is its focus on the teacher as a designer of learning and students as active participants in the learning process. However, with its solid emphasis on students, teachers and schools many of the systemic implications of this approach remain as yet unexplored.

*Learning by Design* positions teachers as designers of learning recognising the importance of their professional expertise in the design process with the eight knowledge processes of the planning framework prompting them to explicitly articulate what and how they want their students to know. The *Learning by Design* planning framework supports teachers to design cumulative and coherent learning sequences that scaffold the students’ learning whilst intellectually challenging their students as they work across the eight knowledge processes. By recording their thinking in their learning designs, the designs can be refined and evaluated based on feedback from colleagues, professional mentors and students. Thus, the design process also becomes a powerful professional learning activity.

For students, these explicit learning designs empower them in the learning process, giving them a clearer understanding of learning goals and expectations. This also allows for a shift in accountability and greater agency for students as with this explicit understanding they can assume greater responsibility for their own learning. In many ways, this creates the type of
learner independence that students are accustomed to from their interactions in on-line environments as they make decisions about how they navigate and participate in these new social spaces. As classrooms using *Learning by Design* reflect not only the practices of these on-line environments but also many contemporary workplaces, the students are developing cultural and workplace competences that are highly prized by employers. Accompanying this long-term benefit, there is the more immediate advantage of greater student engagement with learning along with improved performance.

If this is the type of new learning that education systems want to pursue then a re-evaluation of existing priorities and practices may be necessary for it is considered that this type of approach cannot flourish without support and encouragement. As discussed earlier, within the cluster within which this research study took place there was considerable support from cluster executive and a dedicated mentor who with much creative problem solving negotiated opportunities for professional learning that focussed on *Learning by Design*. However, in a climate where there is an intensification of teachers’ work, largely resulting from increasing accountability and administrative requirements as described by Luke (2004) and Vickers and Singh (2005) among others, there is limited time and monetary resources for the level of professional activity involved in this learning and design process. Despite educational researchers such as Darling-Hammond (2006) highlighting that in high achieving nations teachers are provided with significant time for collaboration, planning and collegial mentoring, this aspect of teachers’ work often goes unrecognised. Teachers also often encounter pressure for rapid change and immediate results, an environment which is not conducive to professional learning or sustained change. To create an environment where new learning will flourish, it may be necessary to re-evaluate systemic priorities in terms of both time and money, and re-allocate resources, including teacher time as well as money, to activities that directly enhance teaching and learning, and re-imagine accountability regimes and administrative requirements in such a way that they actually support the work of teachers and the learning of students.
References


Buchen, I.H. (2006). *Futures thinking, learning, and leading; applying multiple intelligences to success and innovation;* Lanham, Maryland; Rowman & Littlefield Education.


Cope, B. and M. Kalantzis (2007). *New Media, New Learning.* The International Journal of Learning Volume 14, Number 1 (pp. 75-79), Melbourne, Common Ground Publishing Pty Ltd.


Rowe, K.J. (2003). The importance of Teacher Quality as a Key Determinant of Students’ Experiences and Outcomes of Schooling. A discussion paper, Victoria, ACER.


