

**Multiliteracies and Interactive Whiteboards: Exploring Beliefs and Practices in a Primary School Setting**

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**MULTILITERACIES AND INTERACTIVE  
WHITEBOARDS:  
EXPLORING BELIEFS AND PRACTICES  
IN A PRIMARY SCHOOL SETTING**

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Submitted in fulfilment of the requirements of the degree of Doctor of  
Philosophy

October 2009



## **DECLARATION OF ORIGINALITY**

This work has not been submitted previously for a degree of diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Signed ..... Date .....



## **ABSTRACT**

Societal changes, technological advances, globalisation, economies in crisis, and cultural and linguistic diversity are a reality of life today. Changes to the workforce and the call for knowledge workers mean it is important to acknowledge the place of technology and multimodal texts as central to the learning process in schools. This calls for a curriculum and pedagogy that is able to situate these changing conditions. Multiliteracies is proposed as one such approach.

The purpose of this study was to explore beliefs and teaching practices in relation to literacy, technology (Interactive Whiteboards) and a theorised approach to curriculum identified as Multiliteracies (Cope & Kalantzis, 2000; New London Group, 1996). An ethnographic case-study approach with embedded case-study units at the whole-school level, year level and teacher level was applied to build a theorised understanding and description of one primary school culture and to address the two questions guiding the study. The first question sought to explore how teachers' beliefs and practices are shaped by the implementation of Interactive Whiteboards (IWBs). The second question investigated how the implementation of Interactive Whiteboards influenced what counted as Multiliteracies. To provide answers to these questions teachers' beliefs and practices were documented and described as they implemented IWBs for the teaching of literacy. Drawing on the work of Argyris & Schon (1974), teachers' espoused beliefs were compared to their enacted practices. Finally, collective meanings of multiliterate practices were explored during the classroom interactions amongst teachers, students and the IWB.

Findings from this study provide responses to the two questions investigated. In response to the first question, there were six main findings. First, school leadership played a central role in shaping and supporting teachers' beliefs and practices. Second, strategic planning for success by school leadership during the early implementation had benefits for managing progression in teacher practice. Third, contextual factors from within and outside the school had the potential to shape and redirect priorities and minimise changes in teachers' beliefs and practices. Fourth, teachers replicated traditional teaching practices to the IWB learning context. Fifth, teachers' beliefs about their traditional teaching roles and responsibilities were shaped by the interactivity of

the IWB. Sixth, professional development, delivered or prospective, emerged as an important shaper to teachers' practice.

In response to the second question, four main findings were identified. First, the implementation of IWBs, along with access to multimodal texts, meant educators at the school needed to rethink *literacy* as *Multiliteracies*, and to take a multiliterate approach in their teaching tasks. Second, Multiliteracies was an evolving concept where approaches to literacy at both whole-school and teacher level reflected print-based notions. Third, teachers' Technological Pedagogical Content Knowledge (TPACK) was grounded in their experiences of print-based texts. Fourth, some teachers worked from a deficit view of learning making judgements about their students as learners based on incorrect assumptions and beliefs.

This study has presented generalisable findings about how the implementation of IWBs revealed change, and how this happened in one school over time. The development of the IWB Implementation Grid (Kitson, 2009) has provided a theorised understanding of the knowledge needed by schools to enact an effective implementation of IWBs that considers Multiliteracies. It integrates and builds upon knowledge from the literature in three often distinct areas: whole school implementation of IWBs, teacher integration and the impact on their beliefs and practice, and Multiliteracies.

Technology such as the IWB allows access to a range of multimodal texts in classrooms. This study provides the day to day particulars of how this school and teachers dealt with the need to rethink literacy, their existing multiliterate practice, and the challenges they faced as they implemented multimodal texts.

In seeking to explain consistencies and inconsistencies in teacher beliefs and practices, I established that there is an influential relationship between knowledge, teacher beliefs, and teacher practice. Whilst teachers espoused the need to consider literacy as Multiliteracies, they did not yet have the content knowledge and the pedagogical knowledge to enact this in practice. Knowledge appears central to teachers enacting their beliefs about the use of technology. Whilst this relationship is a proposition based on research in one school, it offers further research opportunities.

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## **DEFINITION OF TERMS**

The title for this thesis contains at least two key terms that require explanation.

They are:

### **Multiliteracies**

*Multiliteracies* was a term coined in 1994 by the New London Group, a group of 10 literacy educators who came together to discuss literacy education in light of rapid technological, social and economic changes (Cope & Kalantzis, 2000; New London Group, 1996). The New London Group sought to draw together two key areas of change: (a) multimedia and technology and the range of semiotic systems they use, and (b) cultural and linguistic diversity (Cope & Kalantzis, 2000).

### **Interactive Whiteboards**

An Interactive Whiteboard (IWB) is a touch-sensitive whiteboard screen that is designed to work in conjunction with a computer and a data projector (Smart Technologies, 2005). An image is generated by the computer and projected onto a large whiteboard, where a touch is equivalent to a mouse click. An IWB provides both audio-visual presentation and computer-based interactivity and allows for interaction with electronic content and multimedia resources such as VCR, the Internet, local intranets, CD Roms, CDs, DVDs, a range of computer software, scanners and digital cameras.

# **PUBLICATIONS**

The following publications were submitted during the period of study for this thesis, some of which are referred to within the text.

## **Peer Reviewed Journals**

Kitson, L., Fletcher, M.F., & Kearney, J.F. (2007). Continuity and change in literacy practices: A move towards Multiliteracies. *Journal of Classroom Interaction*, 41/42(2/1), 29-41.

## **Peer Reviewed Conference Papers**

Kitson, L., Fletcher, M.F., & Kearney, J.F. (2008). *Geography of opportunity: Marrying multimodal texts and pedagogy to transform learning*. Paper presented at AERA Conference “Research on Schools, Neighbourhoods, and Communities: Toward Civic Responsibility,” New York.

Kitson, L., Kearney, J.F., & Fletcher, M. (2005). *Transversing the digital divide using Interactive Whiteboards*. Paper presented at Teacher Education: Local and Global, Centre for Professional Development, Griffith University, Brisbane.

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# CHAPTER 1

## INTRODUCTION

My purpose in this study was to explore beliefs and teaching practices in relation to literacy, technology (Interactive Whiteboards - IWBs), and *Multiliteracies* (Cope & Kalantzis, 2000; New London Group, 1996) - a theoretical approach to curriculum. I applied an ethnographic case-study approach with embedded case-study units at the whole-school level, year level and teacher level to build a theorised understanding and description of one primary school culture and to address the questions of the study. The following questions guided the study:

1. *How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?*
2. *How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?*

To inform answers to these questions, I documented and described teachers' beliefs and practices as they implemented IWBs in their teaching of literacy. Drawing on the work of Argyris & Schon (1974), I aimed to understand the relations between teachers' espoused beliefs and their enacted practices. Finally, I explored classroom interactions amongst teachers, students and the IWB to understand how collective meanings were made about what counts as multiliterate practices.

The significance of a research focus on Multiliteracies within global, national and local contexts and the role of IWBs in teaching and learning are presented in the following section of this chapter, preceding my argument for the theoretical significance of this study. An overview of the structure of the thesis is presented in the concluding section.

## **The Significance of Researching Multiliteracies**

Technological advances and globalisation have made their presence felt in everyday life resulting in changing economies, networked societies, digital technologies, and diverse new community and regional cultures. These changes have placed new demands in workplaces, community lives and citizenship (Kalantzis & Cope, 2001). In particular, the effect of digital technologies has redefined skills needed by employers and employees for workplaces within the “knowledge society” (Stewart, 1998) where knowledge associates with three key features related to today’s economy and society: technological, commercial, and cultural (Kalantzis, Cope & The Learning by Design Project Group, 2005).

A knowledge economy relies on technologies for the dissemination of information in and between organisations and consumers (Castells, 2000, 2001). Its importance lies in its capabilities for improvement in productivity and for providing a more competitive advantage. Furthermore, within this type of economy, an organisation’s commercial values are situated in less tangible aspects such as reputation, intellectual property, customer base, and in the ability of the organisation to acquire, organise and utilise knowledge. Cope and Kalantzis (2002) have suggested that from a cultural viewpoint, consumers today are more focused on the representations of products such as aesthetics and brand associations rather than the physical aspect of the product itself.

Technological, commercial, and cultural features of today’s society translate into the work domain, and citizenship and personal identities. Workers within a knowledge economy are required to be flexible and multi-skilled in order to cope with constantly changing computer software and hardware. Within these work organisations, employees are expected to participate within management teams, displaying qualities necessary for successful teamwork. All of this is fostered within a culture that seeks to promote belonging and the commitment of its employees. Additionally, the nature of “the job” has shifted, with people changing employers and careers more often than within stable career pathways of earlier industrial societies (Kalantzis et al., 2005).

Educators have questioned what schools need to consider in order to transform themselves for future relevance if they are to participate effectively in addressing the kinds of preparation tomorrow’s workers, citizens and individuals require. At global,

national and local levels, educational policy and practice in the areas of curriculum and pedagogy have been influenced by these considerations. In particular, there has been a call for the definition of literacy to be broadened to one that includes the notion of literacies, or multiple literacies, which is inclusive of information and communication technologies (ICTs), as opposed to more traditional print-based definitions.

### ***International Significance***

A group of 10 literacy educators, drawing from a wide range of countries, including the United States of America, Great Britain, Australia, and New Zealand, came together in 1994 to discuss literacy education in light of rapid technological, social, and economic changes. Known as the New London Group, they coined the term *Multiliteracies* to summarise two interrelated constructs which resulted from their discussions: a) cultural and linguistic diversity and b) the multiplicity of communication channels and multimedia and the range of semiotic systems they use (Cope & Kalantzis, 2000; New London Group, 1996).

The effects of migration, multiculturalism and the globalisation of labour markets and business enterprises have foregrounded the relevance of cultural and linguistic diversity. As a result of these factors, Lo Bianco (2000) suggested there is a linguistic paradox. On one hand, English is a global language needed for commerce and trade, and the media. On the other hand, English is being fractured into multiple “Englishes,” that are “marked by accent, national origin, subcultural style and professional or technical communities” (Kalantzis & Cope, 2001, p. 11).

The second construct proposed by the New London Group is based on the prevalence of ICTs and multimedia which has spawned a rapidly increasing range of text types. No longer is meaning based purely on written language; it is increasingly multimodal with the prominence of visual, aural, gestural and spatial modes. Both constructs are related to the proliferation of communication channels and media fostering and broadening cultural and subcultural diversity. In some cultures meaning is carried through other modes other than linguistics alone.

In order to prepare students for a technological, global workplace characterised by cultural and linguistic diversity, The New London Group (1996) and others (Cope & Kalantzis, 2000; Kalantzis, 2006; Luke, 2006; Vasquez, 2006) advocated a new

approach to pedagogy to meet these changing conditions. The New London Group proposed a model of Multiliteracies pedagogy which draws an “analogy between literacy, the teaching of literacy, active citizenship and ‘design’” (Anstey & Bull, 2004, p. 79). Kalantzis et al. (2005) suggested that the purpose of education is not solely to create productive workers but to engender actively contributing citizens and to shape individuals with personal identities that are stable and resilient to cope with the changing economic, social, and cultural dynamics of society. The notion of person as a life-long learner underpins these changes.

One particular lifelong ability that students need to develop in light of the technological and information revolution is critical analytical skills (Luke, 2000). The notion of Multiliteracies entails more than being able to effectively communicate with ICTs and multimedia: it embodies the notion of transformation (Cope & Kalantzis, 2000). With increased cultural and linguistic diversity, and the multiplicity of texts, students need to be critical consumers and citizens. This means “they must be able to engage in critical literacy, examining texts and interactions and how they shape values, attitudes and beliefs” (Anstey, 2002, p. 14). This critical analysis and reflection will allow students to take action and to transform their individual, community, and economic lives and to become “designers of social futures” (Cope & Kalantzis, 2000).

The International Multiliteracies Project evolved from the New London meeting and sought to map and extend teachers’ pedagogical and curriculum repertoires. The New London Group (1996, p. 89) described the project framework as embodying:

... a complex and difficult dialogue; these complexities and difficulties will be articulated along with an open invitation for all to contribute to the development of a pedagogy that does make some difference. And third, it will strive continually towards reformulations of theory that are of direct use in educational practice.

The Multiliteracies International Project generated enormous global interest with initial research conducted in a range of international contexts including Australia, South Africa, Malaysia, and Canada. Research which allows for reformulations of Multiliteracies theory is still relevant at international, national, and local levels. Carmen Luke (2000, p. 91) emphasised this point.

The provision for all students – regardless of social circumstance, age, geographic location, or ability – of the technological and Multiliteracies skills requisite for equitable workforce competition and meaningful participation in society is both a social responsibility and an entitlement of all students in the impending Information Age.

### *National Significance*

In Australia, the education sector has been driven by policies at the Federal level designed to address the complex technological, social and economic changes, with the importance of Multiliteracies reflected in curriculum priorities (Department of Education, Employment and Workplace Relations [DEEWR], 2007; Department of Education, Science and Training [DEST], 2004; National Literacy Goal Ministerial Council for Education, Employment, Training and Youth Affairs [MCEETYA], 1997). In the Australian city of Adelaide, in April 1999, Ministers of Education from states, territories and the Commonwealth met and formulated a new set of national goals applicable for schooling in the 21st century. These goals were released as *The Adelaide Declaration on National Goals for Schooling in the Twenty-first Century* (MCEETYA, 1999). This document provided broad guidelines to direct schools and education authorities in acquiring outcomes for students. In particular, in relation to curriculum areas, it advocated for high standards of knowledge, skills and understanding in content areas.

In July 2003, the Ministerial Council for Education, Employment, Training and Youth Affairs (MCEETYA) met with the goal of achieving greater national consistency in curriculum outcomes across content areas. The council developed *Statements of Learning* which described essential skills, knowledge, understandings, and capacities that Australian students should demonstrate by the end of Years 3, 5, 7, and 9. These statements of learning would then inform curriculum documents in all Australian states and territories.

Literacy curriculum has been informed by the *Statement of Learning for English* (Curriculum Corporation, 2005) and supplemented by State and Territory syllabus documents. Both the *Statement of Learning for English* (Curriculum Corporation, 2005) and current syllabus documents (Board of Studies New South Wales, 2003; Department of Education and Training Western Australia, 2005; Department of Education and Training Tasmania, 2007; ACT Department of Education



and Training, 2001; Department of Employment, Education and Training Northern Territory, 2005; South Australian Department of Education and Children's Services, 2004; Victorian Curriculum and Assessment Authority, 2005) highlight that students should master a variety of texts for social purposes, including multimodal texts, which are characteristic of the 21st century. This is also evident in the framing papers for National English Curriculum (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2008).

### ***Local Significance***

Within Education Queensland, the statutory authority of public schooling in the State of Queensland, the theory and practice of Multiliteracies has emerged as an essential element of the learning process and a key focus in all areas of curriculum. The documents supporting this include, *Queensland State Education – 2010* (Education Queensland, 2000a), *Queensland the Smart State – Education and Training Reforms for the Future* (Education Queensland, 2002b), *Literate Futures* (Education Queensland, 2000b), and *Literacy: The Key to Learning* (Education Queensland, 2006b). In particular, the term Multiliteracies has been incorporated into such initiatives as the New Basics project (Education Queensland, 2000c) and *Literate Futures* (Education Queensland, 2000b), a state literacy strategy. These initiatives have resulted in the development of professional learning materials and development opportunities in relation to the teaching of reading in a multiliterate world.

The Learning by Design Project (Kalantzis et al., 2005) is a recent example of one professional development intervention that sought to translate state literacy priorities and Multiliteracies theory at the classroom level. Neville (2005, p. 231), a member of the Learning by Design project, stated that the “meaning many teachers make of Multiliteracies depends largely on their previous professional learning experiences, the reflective connections they make with the theory and how they have taught literacy, or how they have been taught to teach literacy, in the past.” Neville (2005) highlighted that many practices associated with Multiliteracies theory are commonly found in schools in Queensland, Australia. However, literature which documents how teachers are translating theory into practice is not readily available. In particular, there is minimal literature regarding how it translates within the technology rich environment that Interactive Whiteboards offer.

## *The Significance of Researching ICTs Including IWBs*

The demand for a Multiliteracies approach to education, knowledge-based societies and economies acknowledges ICTs as central to the process and a vehicle for change (Australian Council of Deans of Education, 2001; Meredyth, Russell, Blackwood, Thomas, & Wise, 1999; Organisation for Economic Co-operation and Development [OECD], 1997). Reforms prompted by Australian governments, at both state and federal levels, have translated into initiatives designed to embrace new technologies and to construct learning environments that promote a broadened view of what constitutes literacy.

This priority is reflected in a continuing initiative, “The Digital Education Revolution” (DEEWR, 2007), which is viewed as a significant means by which to achieve improvement in Australia’s education and training. Further, its goal is to “contribute sustainable and meaningful change to teaching and learning in Australian schools that will prepare students for further education, training, jobs of the future and to live and work in a digital world” (<http://www.digitaleducationrevolution.gov.au/about.htm>). As well as committing significant funding of \$1.2 billion dollars over five years for the provision of ICTs and networking facilities, the Australian government is committed to spending \$32.6 million on online curriculum resources and tools to support a national curriculum.

In most Australian schools, ICT reforms have led to the integration of the laptop or conventional, desktop computer within school environments though there is variation in how, when, where and amount of usage (Ainley, Banks, & Fleming, 2002; Lee, 2004). However, in one Australian state the government announced it would spend A\$66 million to install IWBs in all schools by 2011 (New South Wales Department of Education and Training [DET], 2008). This follows a similar drive for this technology in the United Kingdom.

What are IWBs? An IWB is a touch-sensitive whiteboard screen that is designed to work in conjunction with a computer and a data projector (Smart Technologies, 2005). An image is generated by the computer and projected onto a large whiteboard where a touch is equivalent to a mouse click. The IWB provides both audio-visual presentation and computer-based interactivity and allows for interaction with electronic content and multimedia resources such as VCR, the Internet, local intranets,

CD Roms, CDs, DVDs, a range of computer software, scanners, and digital cameras. Unlike traditional desk top computer arrangements, IWBs allow for interaction with electronic content and multimedia resources in a range of group situations.

IWBs, like other ICTs, are perceived as offering a world of promise, a medium for change and access to information, changing learning approaches and teaching styles (Watson, 2001). However, in a review of existing research literature concerning the introduction of the IWB in educational settings, numerous researchers (Higgins, Beauchamp, & Miller, 2007; Moss et al., 2007; Smith, Higgins, Wall, & Miller, 2005) consider that there is insufficient evidence to identify the impact of this technology upon student achievement. Furthermore, Smith et al. (2005) raised concerns about interpreting findings from earlier existing literature. In particular, they cautioned about the quality of data collected through the use of informal research methods or literature that failed to document its research methodology. Whilst some research (Glover, Miller, Averis, & Door, 2005; Smith, Hardman, & Higgins, 2006) has revealed the IWB impacts on teaching and learning interactions, Wood and Ashfield (2007) highlighted the teacher as significant to the process.

The implementation of any technology within classrooms involves teachers in a period of growth and transformation (Dias & Atkinson, 2001). Transformational learning theories for adults suggest that this process of growth involves changes in assumptions, perspectives and behaviours. Dias and Atkinson (2001) suggested that the process of transformational learning is evident in teacher beliefs, feelings and teaching practice as they adapt new technologies, such as IWBs, to existing teaching frameworks.

Kent (2003) expressed the view that the adoption of an IWB has led to a revised role of the teacher, referring to this pedagogical practice as “e-teaching.” However, it is not clear if this change in pedagogy reflects a more “multiliterate” focus with classroom teachers needing to consider what new literacies are needed to allow for comprehension and composition (Leu, 2003; New London Group; 1996; Unsworth, 2002), or if technology merely offers ways of replicating traditional pedagogies with a pen and paper approach.

Dwyer (2001) argued that unless technology is used in a transformative manner, it is at best only teaching students minimal computer skills. It is important to understand what is meant by learning as being transformative or enhanced. Hayes and

Yates (2002) commented on the complexity of defining this concept in light of the changing notions of what counts as knowledge and performance in contexts mediated by technology. Whilst engagement is often heralded as a key outcome of ICT of any kind, it is the quality of engagement and the learning and thinking contexts that are offered that have the potential to deliver learning that is more transformative (O'Rourke, 2001).

### **Theoretical Significance of this Study**

The relevance of investigating the practical application of Multiliteracies, particularly in environments mediated by ICTs such as the IWB, has implications at the global, national and local levels. As the goal of education is to produce students who are able to participate fully in public, community and economic lives, literacy pedagogy plays a central role in this aim. Literacy pedagogy used by teachers has wide-ranging implications pertaining to social access and equity, employment, political power, cultural recognition and the reinforcement of social stratification (Cope & Kalantzis, 2000; Luke, Comber, & Grant, 2003). With increasing cultural and linguistic diversity in Australian schools (Bremner & Dufficy, 2006), it is important to address notions of difference as well as the complex environments and range of texts offered by ICTs (Fleming, 2007). A focus on Multiliteracies remains paramount.

This study intends to continue the process of development and reformulation of Multiliteracies theory as advocated by the New London Group (1996). At an international level it will contribute to what the New London Group (p. 89) highlight as “a complex and difficult dialogue.”

On a national and local level, this study will provide case studies in relation to literacy pedagogy which have relevance to such Queensland educational policy documents as *Literate Futures* (Education Queensland, 2000b), *Queensland State Education – 2010* (Education Queensland, 2000a), *Literacy: Key to Learning* (Education Queensland, 2006b) and to the professional skills required for registration with the Queensland College of Teachers. Additionally, whilst many practices associated with Multiliteracies are evident in Queensland schools, practical applications of the theory are not readily available (Neville, 2005). This study will contribute to the

literature by investigating what counts as multiliterate practices in both whole-school and classroom settings by exploring teacher-student interactions.

Research documenting the learning occurring in classrooms and schools during interactions with IWBs is emergent, particularly in Australian settings (Bennett & Lockyer, 2008). Smith et al. (2005, p. 99), argued that the uniqueness of the IWB as a technological tool for teaching and learning “lies in the possibility for an intersection between technical and pedagogic interactivity.” In realistic terms, this means investigating the collective meaning making that occurs in classroom interactions, with both the participants and the IWB itself. They suggested that in order for teachers to use IWBs as transformative devices, research is needed that seeks to capture empirical data that allow for the processes of teaching and learning to be documented.

With this in mind, in this study I will document classroom interactions amongst teachers, students and the IWB as they seek to make collective meanings about what counts as multiliterate practices. I will describe the ways in which IWBs are integrated at a whole-school level and classroom level through a systematic research process, as urged by Smith et al. (2005). Further, this investigation will consider factors that support and constrain multiliterate practices and the role of the IWB and other multimodal resources in allowing opportunities for teaching and learning.

The way of the future is to proceed down the ICT pathway (DEST, 2004). The routes teachers take will be influenced by the findings of this study. The cost of integrating technology into the curriculum is high, with governments and schools already having made considerable investment in ICT and funds committed for the future. Administrators need to make financial decisions relating to the purchase of IWBs as opposed to personal desktop or laptop computers. For those considering whole-school implementation of IWBs this will be especially important. Investment in technology such as IWBs needs to be cost-effective. Furthermore, their potential and effect in relation to student outcomes, both academic and otherwise, need to be seriously evaluated using systematic and rigorous methods (Winn, 2002).

The purpose of this study was to develop a comprehensive understanding of the way in which IWBs can be used to improve the educational experience and achievement of students in developing multiliterate practices which will prepare them to actively participate in a digital world. Lee & Gaffney (2008, p. 6) highlighted that a great deal can be learnt from “pathfinder” or innovative schools such as the one investigated in

this study. Cuttance (2001) proposed that even among innovative schools there is a wide variance in how ICTs are employed. This study will contribute to literature in this area.

### **Organisation of the Thesis**

This introductory chapter has outlined the rationale for my research, which is driven by a need to reconceptualise literacy pedagogy in the context of global and technological changes, in particular in new learning environments mediated by technology such as the IWB. Further, it has underscored the potential significance of systematic research of this topic at a local, national and international level for teachers wishing to transform their teaching practice with a view to enhancing student learning.

The literature relevant to Multiliteracies and IWBs is addressed in Chapter 2. The review focused on three broad areas. First, social and historical conceptualisations of literacy and the impact of ICTs on redefining these conceptualisations are examined in light of Multiliteracies. Second, literature is explored for its discussion of the implementation of ICTs, including the IWB, into schools and classrooms with particular attention to what is known of their impact on learning and teaching. Third, specific attention is given to what existing knowledge offers concerning the interactive learning environments fostered by IWBs for their potential to promote learning and multiliterate practices.

In Chapter 3, I articulate my approach to the conduct of research for this study. A theoretical and conceptual framework is presented to establish the logic of inquiry employed in the research design. It details epistemological and ontological stances, and the theoretical perspectives which underpin them. This provides a theorised rationale for the methods employed. A description of the research design detailing participants, site, data collection methods and procedure for analysis with provision made in relation to optimising validity and reliability is provided.

Findings organised into the two phases of the research are reported in Chapter 4 and Chapter 5. Phase 1 is an exploratory phase which provides an initial reconnaissance of the research site while Phase 2 provides a time intensive observation of the school and one Professional Learning team of teachers within this site. Both phases will be discussed as embedded case-study units at a whole-school level, year level and teacher level. The relevance of these findings is discussed critically in

Chapter 6, and the contribution this research makes to practice and new knowledge is evaluated.

## CHAPTER 2

### REVIEW OF THE LITERATURE

This literature review evolved over the course of the research, as consistent with ethnographic studies (LeCompte & Preissle, 1993). It was an interactive process, whereby as new questions emerged in the course of data collection and analysis, related literature was sought to clarify theoretical concepts and to enhance my understanding. However, the review is now presented in a manner that addresses two research questions which were:

1. *How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?*
2. *How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?*

Literature that informed this study focused on three key areas in order to pinpoint Multiliteracies and the role of IWBs in framing opportunities for the teaching and learning of multiliterate practices. First, it was important to consider the changing nature of literacy during the last two decades. Therefore, this chapter will begin by looking at the social and historical conceptualisations of literacy and the impact of information and communication technologies (ICTs) on redefining these conceptualisations. Second, research on Multiliteracies will be reviewed. Third, as ICTs play a pivotal role in these redefinitions of literacy, literature on the integration of technologies, particular IWBs, into classrooms and schools, and their impact on teaching and learning will be discussed. Within this third section, models of integration will be examined, along with teacher knowledge and the place of schools in realising IWB implementation.



## Constructions of Literacy

### *Literacy as a Social Construct*

Literacy education and what it should entail have been fiercely debated since the 1950s (Cambourne, 2008). These debates have centred around different philosophical approaches to the teaching and learning of reading and writing, and have been escalated by the media and literacy academics into what is known as “The Reading Wars” (Coles, 2003; Ewing, 2006) or “The Literacy Wars” (Snyder, 2008a). These wars have been fuelled by claims of falling literacy standards and of students leaving schools without basic literacy skills (Snyder, 2008b). Concerns about literacy education are not restricted to the Australian context with the implementation of the No Child Left Behind Act in the United States and the Literacy Hour mandate in the United Kingdom.

In spite of this interest in literacy, it is a difficult concept to define. However, current definitions and conceptualisations of literacy continue to acknowledge literacy as socially constructed, and occurring within a range of cultural contexts (Snyder, 2008a). Whilst Luke (1994) described literacy as “a dynamic, evolving social and historical construction” (p. 2), Baynham (1995, p. 1) suggested, literacy is “shaped to serve social purposes in creating and exchanging meaning.” In support of these claims, Bigum et al. (1998) emphasised that literacy was “a meaningful practice ... always inherently bound up with some way or ways of being in the world” (p. 19). Building on this view, Green (2000) suggested that we should regard language “not just as a set of cognitive skills that we either have or do not have, but as forms of behaviour that always take place in a social and cultural context” (p. 3). Green was alluding to an idea proposed by Gee (1990), that of *Discourse*, which has been described as “a socially accepted association amongst ways of using language, of thinking, feeling, believing, valuing, and of acting that can be used to identify oneself as a member of a socially meaningful group or ‘social network’” (Gee, 1990, p. 143).

Gee (1990) distinguished between primary and secondary kinds of knowledge, experience and identity in language learning. Primary Discourse is the primary socialisation which occurs in a child’s early social settings. Secondary Discourse, on the other hand, is tied to the institution of schooling. He proposed that literacy entails the “mastery of, or fluent control over, a Secondary Discourse” (Gee, 1990, p. 153). Students whose Primary Discourse practices are similar to those of school find the

home-school transition easier. However for other children, from more culturally and linguistically diverse backgrounds, the transition from their Primary Discourse to the Secondary Discourses of school is more challenging. As Luke (1993, p. 32) emphasised:

Schools and teachers systematically tend to value and valorise those kinds of cultural capital/linguistic competence which fit the values of dominant classes and cultures, and in effect 'punish' children for not having a priori what schools are charged with delivering, that is, competence with school-style texts and literacy events.

This valuing and valorisation of some students' linguistic competence has encouraged deficit discourses, which Comber & Kamler (2004) argued are dominant in classrooms and staffrooms. Luke & Freebody (1999, p. 5) viewed that failure in literacy was not about individual skill deficits, but "about access and apprenticeship into institutions and resources, discourses and texts." Henderson (2004) suggested that teachers need to view the socio-cultural practices and children's home and community contexts through a wide lens, considering how these complexities impact upon students' lives.

### *Literacy as a Historical Construct*

As well as considering social constructions of literacy, Luke's (1994) conception of the construct suggest that literacy has been, and continues to be, redefined and reshaped as changes occur in society. Thus, it is evident that current notions have been drawn from diverse paradigms and historical contexts (Beavis, 2005). Whilst literacy education in Australia has been influenced by evolving definitions of literacy, literacy practices developed in schools have provided a basis for reflection on different approaches. Ludwig (2003) suggested a set of four categories that teachers, researchers, curriculum writers, and policy makers draw on and upon which syllabus documents have been based (Education Queensland, 1994). They were: skills approach, personal growth approach, cultural heritage, and a critical-cultural approach. The manner in which these approaches have been enacted in classrooms is influenced by teacher interpretation, departmental and community expectations. Ludwig (2003) further pointed out that teaching was rarely a pure interpretation of any one of the approaches. These historical conceptualisations of approaches to literacy instruction in English have

evolved to the recognition of multiple literacies in keeping with the constantly changing, social contexts of the last two decades.

Profound changes in the shape of technological advances and the globalisation of labour markets is confronting society and schools. These influences have resulted in changing economies, flexible workforces, networked societies, and diverse new community and regional cultures, which have in turn created more diverse school populations (Lankshear, Gee, Knobel & Searle, 1997). These changes have been referred to as the “New Times” (Anstey & Bull, 2006; Lankshear et al., 1997; Snyder, 1997). Many social education theorists (Cope & Kalantzis, 2000; Gee, 2004; Lankshear & Knobel, 2001, Luke & Carrington, 2002; New London Group, 1996) have critiqued traditional language-based approaches to literacy education as restricted and outdated in light of these changes.

Literacy pedagogy has traditionally meant teaching and learning to read and write in page-bound, official, standard forms of national language. Literacy pedagogy, in other words, has been a carefully restricted project – restricted to formalized, monolingual, monocultural, and rule-governed forms of language (Cope & Kalantzis, 1996, p. 1).

In response to such criticism, a broader view of literacy and literacy pedagogy has emerged to reflect new contexts of communication and a rapidly changing English language.

### ***Literacy as a Multiple Construct***

The term “Multiliteracies” first appeared in 1994 after discussion by the New London group, a group of 10 literacy educators, regarding the future of literacy education in light of rapid technological, social and economic changes. This term was used by its authors (Cope & Kalantzis, 2000; New London Group, 1996) to encapsulate a new approach to literacy pedagogy which would extend the idea and scope of existing approaches. They proposed that Multiliteracies recognised two interrelated key constructs of the changing times: the increasing prominence of cultural and linguistic diversity and, a multiplicity of communication channels and media. The latter is closely linked to the notion of increasing cultural and linguistic diversity, with the rapid increase of communication channels and media expanding and encouraging increased cultural and sub-cultural diversity.

Cope and Kalantzis (2000) highlighted an important role that schools play in shaping the life opportunities of students. In seeking improved outcomes and the social participation of students from different backgrounds, issues of diversity become critically important. With this in mind, Cope and Kalantzis projected that a curriculum designed for “social futures” should draw together three areas of change: (a) multimedia and technology and the range of semiotic systems they use, (b) cultural and linguistic diversity, and (c) critical literacy.

Unsworth (2001) proposed that the notion of Multiliteracies or multiple literacies is distinguishable not only by multimodality and the mediums and channels of communication but according to domains of learning or content areas (for example, science, maths). Numerous researchers (Applebee, 1981; Davies & Greene, 1984; Gee, 1990; Martin, 1993; Richards, 1978; Street, 1984) have emphasised that each content area has its own “discourses, genres, registers and textual resources” which jointly convey meaning (Queensland School Curriculum Council, 2001, p. 11). Wyatt-Smith and Cumming (1999) investigated the literacy demands of the enacted curriculum in a secondary school setting. Their study found that “literacy demands are dynamic, varying significantly both within lessons and across subjects” (p. 21). Wyatt-Smith and Cumming (p. 29) concluded that “it is no longer appropriate to talk about ‘literacy across the curriculum’, or even literacy and curriculum.” They rejected the view of literacy as singular, and advanced the notion of “curriculum literacies,” which are plural and diverse. This priority was proposed by Cope and Kalantzis (2000) as a skill of a life-long learner and was advanced in the National Inquiry into the Teaching of Literacy (DEST, 2005) and in Queensland policy documents: *Literacy – the Key to Learning: Framework for Action 2006-2008* (Department of Education and the Arts, 2006). In order for students to become literate in the curriculum areas, teachers need to explicitly teach students to comprehend and compose texts that use “specialised text and language structures, vocabulary and graphics” (Department of Education and the Arts, 2006, p. 4).

## **Pedagogical Approaches for the Development of Multiple Literacies**

### ***Four Resource Model***

The Four Resource Model (Freebody & Luke, 1990) is a framework which has been proposed to develop “curriculum literacies” or multiple literacies, and has been promoted in Australia and beyond. It has been popularised by teachers and researchers as a means of discussing reading practices, and planning and delivering a balanced approach to literacy. Whilst the framework was developed originally in relation to the reading of traditional, print texts, it is now used extensively by teachers to plan and evaluate literacy programs that draw on oral, print and multi-mediated modes (Harris, Turbill, Fitzsimmons, & McKenzie, 2001; Healy, 2008). The Four Resource Model involves four interdependent practices: (a) Text-Decoder practices that associate with coding competence, (b) Text-Participant practices that associate with semantic competence, (c) Text-User practices that associate with pragmatic competence, and, (d) Text-Analyst practices that associate with critical competence.

This family of practices shifts the focus from one “correct” approach to the teaching of reading to an emphasis on a group of interdependent literacy practices that are required for successful participation as a literate person. Freebody and Luke (1990) insisted that the four literacy practices of Text-Decoder, Text-Participant, Text-User and Text-Analyst are not hierarchical, nor are they developmentally based in nature.

As a Text-Decoder, a person needs to crack the codes of the semiotic systems within the text. For this to occur, readers must draw upon their own resources in deciphering “marks on the page” or, in the case of visual texts, the codes and conventions of those texts (Anstey & Bull, 2003, p. 92). The role of the Text-Participant is to be able to make meaning of text. The Text-User role focuses on the ability to apply text in real-life situations, with reading serving some kind of practical purpose. These types of practices form a major part of every day life with applications to leisure and other activities. The Text-Analyst role involves practices where the reader critically analyses the text “in order to understand how texts construct and reconstruct our world, how we live in it and the power we exercise over it” (Anstey & Bull, 2003, p. 97). Knowledge of the construction of texts is an important consideration in developing this critical understanding. Anstey and Bull (2003) suggested that in order to engage in this role, a reader needs to access resources from all four reading practices.

## ***Multiliteracies Pedagogy***

Cope and Kalantzis (2000) felt that any theory of pedagogy should be founded on “views about how the human mind works in society and classrooms, as well as about the nature of teaching and learning” (p. 30). They viewed the human mind as “embodied, situated and social”, with human knowledge “embedded in social, cultural and material contexts” (Cope & Kalantzis, p. 30). Multiliteracies was proposed as a supplement to teachers’ current pedagogical practices, not intended to “displace existing practices of literacy teaching, or to imply what teachers have already been doing is somehow wrong or ill-conceived” (Cope & Kalantzis, p. 239).

### **The ‘How’ of Multiliteracies Pedagogy**

Multiliteracies pedagogy is a multifaceted combination of four elements. These are: *situated practice*, *overt instruction*, *critical framing*, and *transformed practice* (Cope & Kalantzis, 2000). Cope & Kalantzis (2000) highlighted that these elements do not represent a linear structure. Rather, they advised that each element can occur concurrently or separately, with one or another dominating at different stages and the continual revisiting of them all during learning. Cope and Kalantzis highlighted that each of these four aspects of pedagogy represents particular traditions in pedagogy and literacy.

Situated Practice draws from work in the cognitive sciences, social cognition, and socio-cultural approaches to language and literacy (Cope & Kalantzis, 2000). It is positioned in the tradition of many of the educational “progressivisms” from Dewey to whole language and process writing (Cope & Kalantzis, 1998). The goal of this pedagogy is to develop mastery in practice through immersion in a community of learners who actively engage in the practices for which mastery is sought (Cope & Kalantzis, 2000). Cope and Kalantzis (2000) also point out that for learning to occur people need to be motivated and have a sense of purpose for their learning. They stressed this immersion “must crucially consider the affective and sociocultural needs and identities of all learners” (p. 33).

Cope and Kalantzis (2000) emphasised that there are limitations to using Situated Practice as the only form of pedagogy. Situated Practice may result in mastery of practice, but this mastery can vary greatly amongst students and also result in the

pursuit of unintended goals. Further, students do not necessarily have “conscious control and awareness of what one knows and does,” nor does it produce learners who can “critique what they are learning in terms of historical, cultural, political, ideological, or value-centred relations” (Cope & Kalantzis, p. 32). For effective teaching and learning to occur, Situated Practice needs to be complemented by other pedagogical approaches.

The goal of Overt Instruction is to address one of the shortcomings of Situated Practice, and to create conscious awareness within learners and control over learning. This aspect of Multiliteracies pedagogy positions itself more in the tradition of many teacher-centred transmission pedagogies (Kalantzis & Cope, 1993). However, Cope and Kalantzis (2000) are quick to point out that whilst it has undertones of drills, rote memorisation, and direct transmission this is not what it entails. Rather, “it includes all those active interventions on the part of the teacher and other experts that scaffold learning activities” (p. 33). It involves explicit and focused learning episodes, in particular, in relation to the development and application of metalanguages, “languages of reflective generalisation that describe the form, content and function of the discourses of practice” (Cope & Kalantzis, p. 34).

Critical Framing supplements another need deemed not sufficiently covered within Situated Practice. Cope and Kalantzis (2000) proposed that once students have achieved mastery of practice through Situated Practice, and have achieved conscious control and understanding through Overt Instruction, there is a need for them to consider their learning critically in relation to its context, historically, culturally, socially, politically and ideologically. Critical Framing draws on recent approaches of critical literacy (Luke, 1992).

Transformed Practice allows students to creatively extend and apply their understandings from the other aspects of Multiliteracies pedagogy to other contexts or cultural sites (Cope & Kalantzis, 2000). This also provides an area for teachers to assess students’ meaning-making. Transformed Practice is harder to connect to other pedagogical approaches. However, Cope & Kalantzis (2000) suggested it has its background in strategies which seek transfer of learning from one context to another, linking theoretical and practical aspects of learning (Lohrey, 1995).

## **The ‘What’ of Multiliteracies Pedagogy**

Situated Practice, Overt Instruction, Critical Framing and Transformed Practice detail ‘how’ to enact Multiliteracies pedagogy. When considering the ‘what’ of Multiliteracies pedagogy and what students need to learn, Cope and Kalantzis (2000) proposed a meta-language of Multiliteracies based on the concept of ‘design.’ They argued that the concept of ‘design’ is central to a range of social, educational and work contexts, and consider that “learning and productivity are the results of the designs (the structures) of complex systems of people, environments, technology, beliefs and texts” (p. 20). Cope and Kalantzis also use the term ‘Design’ to describe the forms of meaning-making, to identify both the organisational structure of products and texts as well as the process of designing the product or text. From this viewpoint, any activity involving semiotic systems of meaning-making as a matter of design involves three elements: Available Designs, Designing, and The Redesigned.

Available Designs refers to the resources that are available for meaning-making in texts including the ‘grammars’ of a variety of semiotic systems (linguistic, visual, audio, gestural and spatial) and the particular combinations of Design elements as represented in “orders of discourse” (Fairclough, 1995). As well as considering meaning as available in the text, Available Designs includes the linguistic and experiential resources of those involved in the process of meaning-making. This moment of Designing is both “continuous with and a continuation of particular histories” (Cope & Kalantzis, 2000, p. 21).

The process of Designing relates to the process of shaping meaning-making with available resources or Available Designs. This iterative process is a transformation of the available resources, and involves “re-presentation and re-contextualisation” rather than reproduction (Cope & Kalantzis, 2000, p. 22). The term “The Redesigned” refers to the new meaning or resources that are produced as a result of this transformation. Cope and Kalantzis (2000, p. 20) emphasised that jointly the three elements of Available Designs, Designing, and the Redesigned highlight the reality that “meaning-making is an active and dynamic process, and not something governed by static rules.”

In order to discuss the elements of meaning-making which are represented in Available Designs and The Redesigned, Cope and Kalantzis (2000, p. 24) proposed that teachers and students “need a meta-language – a language for talking about language, images, texts and meaning-making interactions.” This meta-language needs to allow for



discussion and explanation in relation to structures and purposes of texts and social contexts within which they occur. Further, it must allow for discussion of the pattern of meanings evident in texts which offer different modes of meaning making, evident in the design elements of six main areas: linguistic, visual, audio, gestural, spatial, and multimodal. Multimodal design is where meaning is established through the interaction of two or more semiotic modes.

### **Multimodality**

Both Kress (1997) and Unsworth (2002) proposed that all texts are essentially multimodal. Changes to the semiotic landscape, in particular the prominence of visual modes of representation, denote a considerable change to how we make meaning. Kist (2005) offered that the image, in particular the fast, animated image is privileged over the word. While Kress (1997) reminded us that visual forms of representation have played an important part in communication, it is the emergence of ICTs which have heightened their significance.

However, Unsworth (2002) believed that rather than being replaced by new computer text, traditional literacies are maintaining a role that is complementary, with their co-option and adaption occurring in our changing textual environments (Goodwyn, 1998; Lankshear, Snyder, & Green, 2000; Leu & Kinzer, 2000; Rassool, 1999; Snyder, 1997). In order to foster the development of Multiliteracies, Unsworth (2002) further suggested that it is necessary to understand the bases of their diversity, both in the affordances computer technology offers and the increasing prominence of visual images. For students to develop effective practices with Multiliteracies, they need to be familiar with how language, image and digital rhetorics can be situated independently or interactively to construct different meanings.

In spite of this significance, Kress (1997, p. 55) claimed that “relatively naïve notions of visualisation still dominate.” Visualisation, a term which Kress viewed as misleading, is a term that suggests that “information is ‘translated’, relatively unproblematically, usually from the written mode into the visual mode” (p. 54). However, Kress stressed that a form of expression particular to the different modes of representation “makes possible certain kinds of things, in its particular way, and each prohibits certain things” (p. 55). As a consequence, Kress called for a new theory of

meaning to be developed in relation to multimodal texts, which “deals adequately with the integration/composition of the various modes in these texts: both in production/making, and in consumption/reading” (p. 73).

### **Multimodal Texts**

Multimodal texts which may be encountered in the classroom in print and non-print forms vary from post-modern picture books (Anstey & Bull, 1996), information books, magazines, newspapers in print form and film, video, television, the Internet, and digital mediums including learning objects, DVDs or CD ROMs (Walsh, 2006). Even though children are exposed daily to a variety of multimodal texts in their recreation time (Knobel, 1999; Lankshear et al., 2000; Luke & Luke, 2001), Hamston (2006) found that student teachers in her study did not observe the use of multimodal texts during their school practicum placements. Further, she suggested the task of promoting the use of multimodal texts challenging, with some of these 100 student teachers still defining literacy in terms of foundational print-based literacy skills.

Unsworth (2002) stated that whilst existing print-based teaching practices will endure in the future, they are of themselves insufficient for the development of literacy practices required for a changing future. Information previously presented in traditional text formats is now being offered in different forms of electronic communication. In particular, this move from page to the computer screen has resulted in the use of hypertext, in which information is structured in blocks of text which are connected by electronic links. Sometimes the use of hypertext is supplemented with graphics, digitised sound, animations and videos and may be referred to as ‘hypermedia’ or ‘multimedia’ (Snyder, 1997). This information is arranged in a non-linear way, offering users different pathways, with hypertext blurring the distinction between comprehension and composition. Meaning making is constructed partly by the authors who create the links, but also by the readers who decide between multiple reading pathways (Snyder, 1997).

Coiro (2003, p. 458) asserted that:

Electronic texts introduce new supports as well as new challenges that can have a great impact on an individual’s ability to comprehend what he or she reads. The Internet, in particular, provides new text formats, new purposes for

reading, and new ways to interact with information that can confuse and overwhelm people taught to extract meaning from only conventional print.

Sutherland-Smith (2002) proposed that the Internet impacts upon reading and the strategies required and suggested the need to reform classroom reading practices from those used for traditional print-based texts. Students need to be able to competently access and evaluate information in order to develop understanding for task completion. Leu (1997, p. 65) warned that “individuals unable to keep up with the information strategies generated by new information technologies will quickly be left behind.”

As well as learning new strategies to access multimodal texts, Anstey (2002) and Anstey and Bull (2006) suggested that for students to be multiliterate there are key understandings about texts that students need to develop. Texts are fundamental to literacy programs and planning and teaching should involve the characteristics of multimodal texts. Anstey and Bull (2006) proposed that the characteristics of these texts are as follows: (a) texts are consciously constructed, (b) meanings are actively constructed, (c) intertextuality, (d) a text may have several possible meanings, (e) texts are constructed from a variety of semiotic systems, (f) texts can be multimodal and interactive, and (g) texts will continue to change (pp.24-25).

### **A Review of the Research on Multiliteracies Theory and Pedagogy**

The Multiliteracies theory has been adopted, shaped and extended by researchers in a variety of disciplines. The scope and range of academic literature pertaining to primary and secondary schools vary from the significance of popular culture texts (Clancy & Lowrie, 2002; Kearney & Kitson, 2005; Newman, 2005), visual literacies (Burton, 2006; Callow, 2006; Noad, 2005; O’Brien, 2001), information literacy (Hodgman, 2005), emotional literacy (Liau, Teoh, & Liah, 2003) to multiliterate practices in content areas such as English (Healy, 2006), Health and Physical Education (Ryan & Rossi, 2008), the visual performing arts (Ryan & Healy, 2008; Thwaites, 1999), science (Alverman, 2004) and maths (Lowrie & Clancy, 2003). Additionally, multiliteracy pedagogy has been extended and applied to adult education, including teacher education, and distance education settings (Danaher & Harreveld, 2004; Every & Young, 2002; Huijser, 2006; Rowsell, Kosnick, & Beck, 2008). Mills (2009), however, upon noting the application of Multiliteracies to a broad range of

academic disciplines, countered that Multiliteracies was originally framed around discussions of “literacy and literacy teaching and learning” (Cope & Kalantzis, 2000, p. 9).

Whilst noting the diversity of research that has emerged on Multiliteracies theory and pedagogy, the focus of the research could be classified into four sections. The first pertains to strengths and limitations of Multiliteracies theory and pedagogy. The second body of research relates to uptake of Multiliteracies pedagogy. The third concerns the relevance and use of popular culture and mass media texts in the classroom. The fourth relates to multimodal design and the development of meta-language for Multiliteracies.

### ***Strengths and Limitations of Multiliteracies Theory***

The publication of the Multiliteracies manifesto by the New London Group in 1996 has resulted in mixed reviews by numerous educators (Abbott, 2002; Auerbach, 2001; Street 2000, 2003). Street (1997, 2000, 2003), a proponent of the New Literacy Studies, contrasts the notion of Multiliteracies with that of “multiple literacies.” He maintained that a multiple literacies focus enables literacy practices to be viewed as socially grounded rather than as technologically determined. He commented that the notion that computers will change the way we think and behave implies “a reversion back to older determinist and reductionist accounts of the ‘impact’ of ‘new literacies’” (2003, p. 2825). Instead Street proposed an ‘ideological’ model of literacy, which highlights that “it is the social construction of such technologies and their instantiation in specific social contexts that creates such ‘impact’ rather than literacy and its technologies in themselves” (2003, p. 2825).

Auerbach’s (2001) response to the Multiliteracies manifesto was ambivalent. She felt that the theory’s usefulness varied depending upon the contexts of application. Auerbach’s discussion evolved around the four aspects of Multiliteracies pedagogy: Situated Practice, Overt Instruction, Critical Framing, and Transformed Practice. She highlighted two key problems. First, Auerbach contended that “unless the ideological bases of each of the four components and their implications for practice are made explicit, the pedagogy itself lays itself open to distortion and co-option” (p. 99). She emphasised that practices which are rooted in different pedagogical traditions may be

oppositional, and that the ideology needs to be clearly outlined along with its implication for pedagogy. Second, Auerbach commented that the “notion of Multiliteracies becomes more than a supplement to traditional literacy pedagogy because the proposed new pedagogy has fundamentally different aims and purposes” (p. 107), in particular with its goal of transformation.

Whilst Auerbach (2001) had concerns on the theoretical level of Multiliteracies, on the practical level she considered that it would solve certain problems. The aspects which Auerbach found problematic for teachers theoretically, she found productive as a model for teacher education. She felt that Multiliteracies pedagogy presented “a way for teachers to develop their own stance by investigating the effects of different components within their own contexts” (p. 107).

Numerous authors (Cameron, 2000; Pennycook, 1996; Prain, 1997; Trimbur, 2001) have criticised Multiliteracies in relation to their notion of meta-language. Pennycook (1996) was less impressed by the ‘what’ of Multiliteracies or the designs of meaning, stating that “this remains rather a vague formulation” (p. 169). Prain (1997) also raised issues around the concept of Design. He countered that whilst the New London Group (1996, p. 74) suggested that meaning-making is not “governed by static rules” that “their elaboration of codes and checklists of elements immediately seems to contradict this assertion, or at the very least to accentuate formal aspects of texts as the major basis for literacy learning” (Prain, p. 458).

Pennycook (1996) emphasised a sense of vagueness was evident in other aspects apart from the notion of Design. Terms like *hybridity*, *multi's*, *global diversity*, and in particular “increasing local diversity and global connectedness” (p. 3) left Pennycook pondering their meaning. He stated that “local diversity and global connectedness do not seem to be a sufficient formulation on which to construct a notion of difference and thus a more inclusive notion of Multiliteracies” (p. 169). In spite of this critique however, Pennycook (Pennycook, 1996, p. 169) offered an opinion that Multiliteracies “is an exciting cooperative venture in its early stages that I think promises much more”.

Michaels and Sohmer (2001) highlighted the complexity of working from the “utopian vision” of the Multiliteracies manifesto “to real teaching and learning situations where teachers work under widely different national and local conditions, and bring to the table vastly different experiences, interests, and ‘available designs’” (pp.

54-55). Further, they proposed that components of the pedagogy “by themselves convey neither the power nor the particulars of what teachers do from moment to moment” (p.56). However, Michaels & Sohmer( p.56) countered that whilst they are members of the New London Group, “these four features were never intended as the final word, as specific marching orders to teachers... We hope to include more centrally the perspectives, the voices, and the practices of teachers”.

### *‘Take up’ of Multiliteracies*

Research on Multiliteracies was established in a variety of international contexts due to the founding of the Multiliteracies International Project. Early reports of the implementation of Multiliteracies pedagogy in South African and Australian contexts by Newfield and Stein (2000), Bond (2000), and Cazden (2001) indicate it as successful. Hammond (1999, 2001) reported that whilst some schools did enact Multiliteracies in a committed way, overall there was a stronger focus on Four Resource Model (Freebody & Luke, 1990) in Sydney schools investigated. Nonetheless, work has continued in schools, with Kalantzis and Cope (2004, 2005) reshaping Multiliteracies and applying it in a variety of educational institutions globally.

A key premise of Multiliteracies was to provide “access without children having to erase or leave behind different subjectivities” and to be “generally fair in the distribution of opportunity” (Cope & Kalantzis, 2000, p. 18). For this reason a significant amount of the literature on Multiliteracies theory and pedagogy has focused on catering for culturally and linguistically diverse groups who are disadvantaged or have issues of access and participation (Lotherington, 2008; Mills, 2005a, 2005b, 2006a, 2006b; Smith & Woodward, 2007). Janks (2004) conducted a study in a South African primary school. In Years One to Four students learn through the medium of Setswana, whilst learning English as a subject. When progressing to Year 5, teachers regularly code-switched between the two languages to assist student understanding. However, by Year 7, students were expected to respond only in English, which prohibited 90% of the students from responding as they had not mastered the dominant language. Janks highlighted that English is the dominant world language and as such provides students with ‘linguistic capital’ (Bourdieu, 1991). By providing people with access to the dominant language, the dominance of English is perpetuated. However, on the other hand, denying students’ access perpetuates their marginalisation in a society

that continues to recognise this language as a mark of distinction. This contradiction is referred to by Lodge (1997) as the ‘access paradox’.

Critical ethnographic research conducted by Mills (2005a, 2005b, 2006a, 2006b, 2006c, 2006d, 2007a, 2007b) investigated issues of power and access in one Australian Grade 6 classroom. A key finding was that “students’ access to multimodal semiosis was not distributed equally because of complex interactions between the enactment of the Multiliteracies pedagogy, power relations and classroom discourses” (Mills 2009, p. 107). Further, she found that the classroom teacher reverted to teaching practice that favoured print-based literacy. Whilst Multiliteracies pedagogy has been touted as providing equitable access to all groups of students over traditional approaches, both Auerbach (2001) and Mills (2006c) restated that the issue of equitable access for all must be understood in the context of the institution of schooling with factors that both constrain and enable its successful realisation.

### ***Popular Culture Texts in the Classroom***

Research on the relevance, inclusion and practical application of popular and multimedia texts in primary and secondary curriculum forms an emerging body of research pertaining to Multiliteracies (Healy, 2006; Kearney & Kitson, 2005; Mackey, 2003; Mason, 2004; Newman, 2005; Nixon & Comber, 2001; Stevens, 2001). This has responded to the call to include texts which relate to students’ lifeworlds and identities. The inclusion of popular culture and multimedia texts, however, does not sit easily with proponents of a cultural heritage approach to English curriculum, who value “historically ratified texts” (Hollingdale, 1995, p. 249). However, some authors (Mackey, 1998; Unsworth, 2006) question the distinction between ‘quality literature’ and ‘popular culture’, acknowledging that the boundaries are somewhat blurred with the availability of classic stories and literature available in a variety of electronic formats.

### ***Multimodal Design***

A multimodal metalanguage was another aspect of Multiliteracies acknowledged for ongoing reformulation due to critiques discussed in an earlier section of this review. Numerous scholars and researchers have responded to this call, extending Halliday’s functional linguistics to multimodal semiosis (Jewitt, 2006;

Unsworth, 2001, 2006). Other authors have sought to develop a new metalanguage to describe the convergence of words and images, sounds, gestures and spatial elements (Callow, 2006; Hamston, 2006; Jewitt, 2006; Jewitt & Kress, 2003, Kress & van Leeuwen, 2001, Unsworth, 2001). However, Kist (2005) suggested that whilst multiple forms of media are being used in the classroom, that teachers are not engaging in “critical conversations” or “metadialogues” with regards to the symbol systems.

### ***The Learning by Design Approach***

Kalantzis and Cope (2004) and Kalantzis et al. (2005) have since reworked their notion of pedagogy with Kalantzis (2006, p. 7) stating that “New Learning” must be “creative, itself an agent of change rather than merely reflective of change.” They have suggested this can be achieved by considering a theory of learning embedded in an epistemological viewpoint, rather than a psychological/cognitive one. This seeks to build on the work of Vygotsky (1978) with a focus on the processes of how individuals gain knowledge. Kalantzis et al. (2005) stated that these acts of knowing allow us to learn about the world through meaning and action. They highlighted that ways of meaning and acting are plural and that there are multiple ways of knowing: *experiencing, conceptualising, analysing and applying*. Further, they proposed that the particular mix of these four will reflect differences amongst and between cultures, learners, knowledge domains and pedagogies. With this in mind, the Learning by Design approach is

... not attempting to prescribe a pedagogical formula, and least of all a rigidly defined framework for documenting learning. Rather, its aim is to clarify the shape and form of pedagogy, its various knowledge processes and movements from one knowledge process to another, whatever that pedagogy may be. (Kalantzis et al., 2005, p. 81)

Kalantzis et al. (2005, p. 72-73) stated that each of these four knowledge processes of the Learning by Design approach is “more or less equivalent to one of the curriculum orientations in the Multiliteracies pedagogy”. This comparison is provided in Table 2.1.



**Table 2.1 Learning by Design and Multiliteracies Equivalences**

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Learning by Design: Knowledge Processes	Multiliteracies Curriculum Orientations
Experiencing	Situated Practice
Conceptualising	Overt Instruction
Analysing	Critical Framing
Applying	Transformed Practice

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Kalantzis et al., (2005) trialled the Learning by Design approach to learning, pedagogy, and curriculum in Australian and Malaysian classrooms. Their study documented the professional learning of teachers. This approach also attempted “to imagine and test innovative tools and learning environments in which the blackboard, textbook, exercise book and test are augmented and at times replaced by digital technologies” (Kalantzis et al., p.vi). They further stated that “this is not simply a case of a ‘digital makeover’ of legacy teaching practices: it is a process of imagining how learning may be different and more effective.” Kalantzis et al. proposed the implications of new ICTs and multimedia is that “they allow for very different ways of engaging, relating and communicating” (p. vii). They viewed the role of the teacher and pedagogy as crucial to learning, with the new technologies supporting teachers to become learning designers and learning managers. Kalantzis et al. (2005), after reviewing findings from their project, stated that whilst a few schools are working in digital mediums, “the full educational potentials of the digital technologies have as yet nowhere been realised” (p. 145). From the same project, and reporting on teachers from the Lanyon Cluster in the Australian Capital Territory, Van Haaren (2005) highlighted that whilst using multimodal texts was an important aspect of Multiliteracies, teachers still continued to privilege print texts. Neville (2005) reported that many practices associated with Multiliteracies theory are commonly found in schools in Queensland, Australia. However, literature which documents how teachers are translating theory into practice is not readily available. In particular, there is no literature regarding how it translates within the technologically rich environment that the IWB offers.

## **Adoption of IWBs in Classrooms**

Interactive Whiteboards were originally designed for the corporate market and were introduced into educational settings in the 1990s, primarily in England, Canada and America and more recently in Australian schools. In the late 1990s the potential use in primary or elementary schools was acknowledged by Moseley et al. (1999). Several reviews of the literature pertaining to the use of IWBs in education settings have been conducted (Glover et al., 2005; Higgins et al., 2007; Smith et al., 2005). Earlier literature was descriptive in nature, detailing the introduction of IWB technology and indicating its potential (Higgins et al., 2007). The potential of the IWB was based on numerous affordances it offers for teaching and learning purposes (Kennewell, 2001; Smith et al., 2005). Much of this research was small scale and revealed the passion of the 'early adopter', 'initial innovator' (Rogers, 1983) or 'missioners' (Glover & Miller, 2004).

### ***IWBs for Teaching***

As tools for teaching, Smith et al. (2005) found common benefits that IWBs offer are: flexibility and versatility, multimedia/multimodal presentation, efficiency in presentation, support of planning and the development of resources, modelling ICT skills and greater interactivity and participation in lessons. Research has indicated that IWBs are both a flexible and versatile teaching tool across a variety of year levels and settings (Austin, 2003; Jamerson, 2002). These include all aspects of the primary years, including early childhood settings (Lee & Boyle, 2003; Wood, 2001), secondary school settings (Jewitt, 2005), special education settings, and higher education (Damcott, Landato, Marsh, & Rainey, 2000; Malavet, 1998). Furthermore, IWBs have been employed successfully to cater to the diverse learning needs of students with hearing and vision impairments (Cooper & Clark, 2003; Jamerson, 2002).

Flexibility and versatility of IWBs was also reflected within the content of activities and lesson content, from the development of literacy and handwriting skills (Smith, 2001), to include content related to mathematics, science and foreign languages (Thomas, 2003). Goodison (2002a) found that some students preferred using the IWB, as manipulating the mouse and the keyboard on a computer was more challenging. Teachers were able to cater for a range of needs within a lesson, allowing both

reinforcement of prior lesson content with the facility of the IWB to flip back and forth between different programs and resources (Miller & Glover, 2002).

The range of multimedia resources and opportunities for multimodal presentation has been highlighted as a major benefit of the IWB, with teachers utilising a greater variety than with other teaching approaches (Levy, 2002). The ability to control the computer with the touch of the screen has also allowed efficient, professional presentation of materials (Boyle, 2002; Thomas, 2002). Further, the ability to access and use prepared lessons was perceived as a benefit, allowing a smoother transition within the lesson and increasing the pace of lessons (Virtual Learning, 2003). Whilst researchers (Glover & Miller, 2001; Greenwell, 2002, Levy, 2002) have highlighted that it is time consuming to develop the technological skills and to prepare lessons with the IWB, teachers reported that planning time would eventually be reduced, allowing the ability to share and re-use lessons amongst peers (Lee & Boyle, 2003).

One benefit, seen as incidental to IWBs is the development or improvement of students' ICT skills through observation of skills that teachers model. Students are able to "observe the manipulation of the operating system, the main applications and the network structure on a routine basis, so that when they come to use computers in class ... they are fully aware of what needs to be done" (Goodison, 2002b, p. 288). Richardson Primary School in the ACT, has reported that it does not explicitly teach ICT skills, as students gain enough experience by observing the teacher and through their own interactions with the IWB (Lee & Boyle, 2003).

### ***IWBs for Learning***

Interaction with the IWB itself has been reported as one of the main advantages in using it as a learning tool. Interactive Whiteboards have been reported as promoting student learning by increasing the level of student engagement in the classroom through increased motivation and improved enthusiasm for learning. Numerous researchers (Beeland, 2002; Hall & Higgins, 2005; Lee & Boyle, 2003; Levy, 2002) reported that students found lessons more interesting which led to improved attention and behaviour. The multimedia nature and style of the IWB, with its large digital screen is thought to relate to the multimodal literacies that students are engaging with outside the school

environment in their recreational time and to accommodate a range of learning styles (Glover & Miller, 2001). However, Smith et al., (2005) suggested that the claim about learning with multimedia should be questioned, as recent research indicates the use of visuals does not necessarily produce understanding (Goldman, 2003). The opportunity to interact with the IWB and to use it to share and discuss student work has been reported as likely to improve attention and engagement (Bell, 2001; Burden, 2002; Miller & Glover, 2002). The ability to actively involve students with the lesson content has been credited with increased school attendance and greater retention of knowledge (Smart Technologies, 2004).

However, some research indicates that teachers are not involving students to a large extent as student involvement can slow the pace of the lesson, with some students becoming bored (Bell, 2001; Kitson, Kearney, & Fletcher, 2005; Smith, 2001). The IWB was also purported to create whole class interaction and collaboration. However, Smith (2001) suggested that fixing an IWB to a wall conflicts with this ideal. Smith et al. (2005) proposed that the implicit structure of whole-class lessons with the IWB is reminiscent of teaching practice known as the recitation script (Tharpe & Gallimore, 1988). Other researchers such as Lee (2004, p. 1), however, have proposed that IWBs have the potential to “fundamentally change and enhance the nature and quality of schooling.” Kent (2003) has expressed the view that the adoption of the IWB has led to the revised role of the teacher, referring to this pedagogical practice as ‘e-teaching’. Some researchers suggested that the “novelty value” of IWBs may wear off as students become accustomed to its main features (Levy, 2002; Miller & Glover, 2002). This was confirmed in research by Moss et al. (2007, p. 4) who stated that “any boost in motivation seems short-lived.”

### ***Constraints Associated with IWBs***

Constraints associated with the use of IWBs for teaching typically relate to practical and logistical issues, and/or inadequate training. Reflecting the former, Tameside Metropolitan Borough Council (2003) reported students often had difficulty in viewing what was on the IWB due to the glare of sunlight and this limited the value of IWBs in many classes. Other visual issues such as the use of inappropriate colours, font, or the presence of dust on the IWB screen or the projector (Levy, 2002) are listed as inhibitory while awkwardness associated with where a teacher or student needed to

be positioned so as to avoid casting a shadow on the screen (Bell, 2001; Walker, 2003) are problematic. Placement and height of permanently fixed boards could also affect their accessibility for manipulation and/or viewing (Canterbury Christchurch University College, 2003; Tameside MBC, 2003). Some teachers reported difficulties with the movement of the board or projector, requiring re-alignment and re-calibration of the board (Canterbury Christchurch University College, 2003).

Professional training was an issue identified frequently in the literature as challenging where there is availability or sufficiency shortfalls. For example whilst initial training by the suppliers enthused teachers to use IWBs (Glover & Miller, 2001), unless this momentum was maintained teacher “enthusiasm quickly wanes” (Walker, 2003, p. 2). Levy (2002) reported that teachers who were confident in ICT use were likely to become early adopters, and would experiment and developed their IWB use after initial training. Others less confident, however, would require more continued, individual guidance (Granger, Moreby, Lotherington, Owston, & Wideman, 2002). Sometimes even when assistance was available, teachers wanting to apply IWBs in a transformative manner were frustrated by the lack of practical and methodological training (Greiffenhagen, 2000; Malavet, 1998) that might otherwise allow them to do so.

### ***Pedagogical Use***

As teachers have become more comfortable with the IWB technology, literature reflects an additional challenge in the need of teachers and researchers to explore relationships between the IWB and approaches to pedagogy (Glover et al., 2005; Higgins et al., 2007). Recognition of this new confrontation seems to have evolved through indications that now-confident teachers’ use of IWB instead of innovating new systems of interaction amongst classroom participants replicated more traditional patterns notably, Initiate – Respond – Evaluate (IRE) (Knight, Pennant, & Piggott, 2004; Schuck & Kearney, 2007) with teacher talk taking the lead.

Whilst engagement had been identified as an earlier potential of the IWB for learning, O’Rourke (2001) argued that consideration was needed about the quality of what would ensue as engagement and the nature and effectiveness of thinking and learning contexts that allow for transformative learning. She nominated three

perspectives that might be included: *technical*, *practical*, and *critical*. The first level should be about how to use particular software and hardware and the second about the use of technologies to achieve particular purposes. The final level is the extent to which participation prepares students for the future. At this *critical* level, students “read the world” as well as “read the word” (p. 5) – an approach similar to the concept of *critical literacy* in Multiliteracies.

Other notions of what pedagogy should entail have shaped ICT professional development with a focus on higher order thinking. On a local level, this is reflected in the *ICT Pedagogical Licence* (Education Queensland, 2006a) and the *Intel Teach to the Future* (Intel Corporation, 2005) both of which aims to prize and develop teacher pedagogy with ICTs. The latter has endorsed a pedagogy that promotes higher order thinking and “problem solving, critical thinking and collaboration skills among students” (Intel Corporation, <http://www.intel.com/education/teach/>).

At Richmond Primary school in Australia, Kent and Holdway (2009) embedded aspects of Productive Pedagogies (Education Queensland, 2002a) to promote intellectual quality. Productive Pedagogies was based on the *Queensland School Reform Longitudinal Study Report* (Education Queensland, 2001) which drew upon and extended the work of Newmann & Wehlage (1993a, b) and their model of ‘authentic instruction’ or ‘authentic pedagogy’. Key aspects of pedagogy to ensure improved student outcomes were: *Intellectual Quality*, *Connectedness*, *Supportive Classroom Environment*, and *Recognition of Difference*. According to the *Queensland School Reform Longitudinal Study Report* teachers seeking to develop the first of these Intellectual Quality need to focus on: *higher order thinking* which involves transformation of student knowledge; *deep knowledge* of concepts, which is to be achieved through *substantive conversation*; *knowledge as problematic*, which views knowledge as constructed; and a *metalanguage* when talking about how written and spoken texts work.

Moss et al. (2007) nominated three important themes that direct thinking about how IWBs might change pedagogy. These are: “increased pace of delivery; increased use of multimodal resources, incorporating image, sound, movement in new ways; and a more interactive style of whole class teaching”( p. 6). They stressed that each of these can be approached in either a shallow, surface approach or a deep approach. The former

focuses purely on technical and physical interaction with the IWB, whilst a deep approach integrates IWB use within pedagogical aims.

McCormick and Scrimshaw (2001) asserted that teaching with ICT can only be enhanced if interactivity is understood. Yet, there may be difficulties with what is understood as interactivity. Findings from Moss et al. (2007) show that teachers conceived of it in different ways, and that this variation, impacted upon their pedagogy. They classified interactive uses of the IWB in three ways:

- *Technical interactivity* – where the focus is on interacting with technological facilities of the board;
- *Physical interactivity* – where the focus is on ‘going up the front’ and manipulating elements on the board and;
- *Conceptual interactivity* – where the focus is on interacting with, exploring and constructing curriculum concepts and ideas (Moss et al., p. 40).

Further, they found that how interactivity is used in the classroom is itself a complex interaction amongst teachers’ pedagogic theories of learning, the demands of content areas and topics, perceived student abilities, and available time and peripherals.

### ***The Impact of IWBs***

Smith et al. (2005) found there were no rigorous studies documenting student academic achievement or changes to classroom interaction. This absence has begun to change recently with the publication of evaluative research reports (Moss et al., 2007) and peer-reviewed journals (Kennewell & Higgins, 2007). However, little evidence of the impact on students’ achievements has emerged (Higgins et al., 2005; Moss et al., 2007). Some research has revealed changes to teaching and learning interactions when using IWBs (Glover et al., 2005; F. Smith et al., 2006). Nonetheless, Higgins et al. (2007, p. 221) have concluded that “the research literature has yet to demonstrate the direction that teachers need to move to ensure that the proven changes the IWB can bring about in classroom discourse and pedagogy are translated into similar and positive changes in learning.” Bennett and Lockyer (2008) stated further research is needed about the impact of IWBs on teacher practices and student learning. They highlighted

most research presents a snapshot perspective, whereas longitudinal studies which may explain how teachers change as they adapt to IWBs are harder to find.

### **Models of Technology Integration**

Different models of technology integration have been proposed related to technology generally (Hooper & Reiber, 1995; Sandholtz, Ringstaff, and Dwyer, 1997) and for IWBs (Miller, Glover, & Averis, 2004; Somekh et al., 2005). After observing twelve mathematics lessons, Miller et al. (2004) conceptualised enhanced pedagogical use of the IWB as a three-step process. These are:

- *Supported didactic* where the IWB provides a visual support for the lesson but is not central to concept development,
- *Interactive* where affordances of the IWB are used to challenge student thinking through illustration, development and the examination of discrete concepts, and
- *Enhanced interactive* where the IWB is integral part of teaching and the interactivity of the IWB is utilized to enhance conceptual understanding.

Miller et al. (2004) considering this conceptualisation suggested the length for development of such pedagogical enhancement would likely be, “something in the region of two years” (Moss et al., 2007, p. 94). However, they also acknowledged that it is likely to be quicker if there was a coach or mentor within the subject or content area, especially if that mentor was a ‘missioner’ (Glover & Miller, 2003, 2004).

Models of IWB integration generally reflect similar patterns of use as other technologies (Jones, 2004; Moss et al., 2007; Scrimshaw, 2004). Somekh et al. (2005) who adapted a model of technology adoption proposed by Hooper and Reiber (1995) have proposed other frameworks for integration. Hooper and Reiber’s (1995) framework was advocated in the 2004 advisory document of the British Educational Communications Technology Agency (Becta). It has five steps: *Familiarisation*, *Utilisation*, *Integration*, *Reorientation*, and *Evolution*. Somekh et al. (2005) adapted this framework to the IWB and also described five stages of development: *foundation*, *formative*, *facility*, *fluency* and *flying*.



Another way of describing technology integration by teachers has been suggested by Sandholtz, Ringstaff, and Dwyer (1997). The value of this model is that stages of growth are linked to required professional development that allows for progression through the stages. They assert that the technology integration of teachers falls into five different evolutionary stages. Each of these has its own patterns of change and support requirements to progress to the next level. These five stages are entry, adoption, adaptation, appropriation and invention.

During the *entry stage*, teachers are reluctant to try new things, reverting to traditional teaching methods. Whilst integrating computer technology into the traditional classroom, they may encounter problems with its resources and technical issues. Once they have progressed to the *adoption stage*, teachers are making a more conscious effort to integrate technology into daily lessons, but with limited activities such as keyboarding, word-processing or drill and practice activities – much as described earlier with teachers using IWBs but adhering to IRE interactions. Whilst they may still have concerns about technical issues, teachers begin to display some troubleshooting capabilities at a basic level. In these two early stages, the support needed for educators to advance is collaboration with peers with respect to planning and teaching experiences. Also of paramount importance according to Sandholtz et al. (1997) is that teachers get appropriate training in computer-assisted instructional methods and word-processing software.

As teachers progress to the *adaptation stage* they integrate new technologies. They have students use a greater variety of programs, producing work at a faster rate. During this stage teachers have learned to use computers as time-saving tools rather than creating additional demands. With this focus on greater productivity Dwyer, Ringstaff, and Sandholtz (1990) suggest there are three important support issues that need to be addressed. First, peer observation and team teaching should be encouraged with a flexible schedule developed that allows for this to occur. Second, alternative pedagogies should be introduced and discussed. Third, staff should be trained in a wider variety of software packages to foster greater productivity, such as spreadsheets, e-mail, databases, and Hyperstudio.

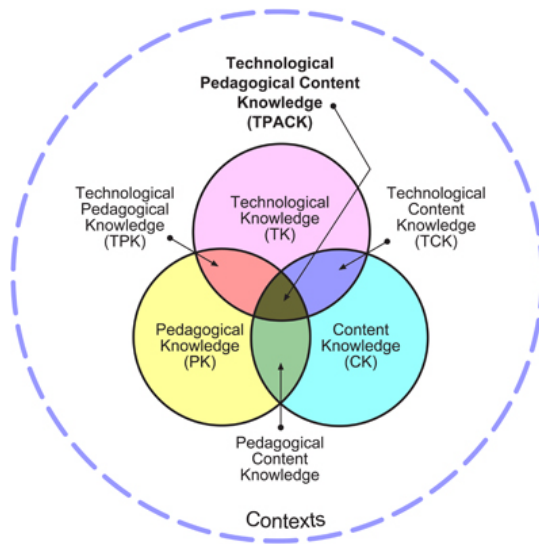
Sandholtz et al. (1997) describe the *appropriation* stage as a milestone. Here teachers and students displaying an understanding of the technology's usefulness and ability to apply it effortlessly as a tool to accomplish tasks. This stage is marked by

more student interaction, and students are working more frequently with computers for curriculum related projects. The ultimate goal is to reach a stage where there is greater *invention*. In this stage, teachers experiment with their new pedagogical styles and how they relate to students. This means being more reflective of their teaching and old teaching patterns. This stage supports the notion that students actively construct knowledge, with student experts coming to the fore to assist their peers and teachers with technological problems.

If teachers are to progress in their learning and impact on student achievement, Sandholtz et al. (1997) suggest the need for professional development through conferences and presentations where they reflect upon their technology integration goals when planning. Additionally, they urged collaboration between teachers and to support to write and publish their findings, and further that support systems outside the school network be created through the email and Internet. Finally, they thought these teachers should share their knowledge by mentoring other colleagues (Sandholtz et al., 1997).

### **Technological Pedagogical Content Knowledge (TPACK)**

Numerous scholars have argued that the use of technology is not context-free and needs to consider an understanding of how technology relates to pedagogy and content (Hughes, 2004; Keating & Evans, 2001; Lundeberg, Bergland, Kylczek, & Hoffman, 2003; Niess, 2005; Zhao, 2003). Mishra and Koehler (2006, p. 1017) argued that “thoughtful pedagogical uses of technology require the development of a complex, situated form of knowledge” that they call Technological Pedagogical Content Knowledge (TPCK, now TPACK). It was proposed for educational technology and extends and builds on Shulman’s (1986) formulation of pedagogical content knowledge. Mishra and Koehler’s framework draws from their research on teacher professional development and faculty development in higher education. This research sought to outline the qualities of teacher knowledge required for technology integration in teaching.



**Figure 2.1. TPACK Model (Mishra, 2008)**

The model illustrated in Figure 2.1 is based on three intersecting types of knowledge; content knowledge, pedagogical knowledge and technology knowledge. *Content Knowledge* (CK) entails knowledge about the subject matter or content that is to be taught or learned. This includes knowledge of facts, concepts, theories, procedures and explanatory frameworks that connect ideas within a subject area (Shulman, 1986). Mishra and Koehler (2006, p. 1026-1027) framed *Pedagogical Knowledge* (PK) as an encompassing knowledge about the processes and practices of teaching and learning. This includes knowledge of the cognitive, social and developmental needs of students, and how they learn, the teaching strategies or methods to be used in the classroom, and the evaluation methods to be used to check the effectiveness of the teaching-learning delivery. Mishra and Koehler's (2006) idea of *Pedagogical Content Knowledge* (PCK), which is the intersection of content and pedagogy is consistent with Shulman's (1986) knowledge of pedagogy that pertains to the teaching of specific content. This involves a match between teaching approaches and content, and being able to arrange aspects of content for better teaching. It is "concerned with the representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of students' prior knowledge, and theories of epistemology" (Mishra & Koehler, 2006, p.1027).

*Technology Knowledge* (TK) relates to knowledge about how to operate a variety of technologies, and the ability to learn and adapt to new technologies. Mishra and Koehler (2006) emphasised that technology drives decisions about content and

pedagogy. With this in mind, they proposed the need for *Technological Content Knowledge* (TCK) and *Technological Pedagogical Knowledge* (TPK). *Technological Content Knowledge* (TCK) is concerned with the reciprocal relationship between technology and content, and “the manner in which the subject matter can be changed by the application of technology” (Mishra & Koehler, 2006, p.1028). This comprises the affordances and constraints of the different representations made possible by different technologies. *Technological Pedagogical Knowledge* (TPK) is knowledge of the capabilities of various technologies for teaching and learning, and how teaching may alter as a result of using particular technologies. Mishra and Koehler (2006, p.1028) elaborates on this to include “an understanding that a range of tool exists for a particular task, the ability to choose a tool based on its fitness, strategies for using the tool’s affordances, and knowledge of pedagogical strategies and the ability to apply those strategies for use of technologies.

*Technological Pedagogical Content Knowledge* (TPACK) is a form of “understanding that emerges from an interaction of content, pedagogy, and technology knowledge” and is “different from knowledge of all three concepts individually” (Koehler & Mishra, 2008, p.17). Koehler and Mishra (2008, p.17-18) argued that it:

...is the basis of effective teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones.

Since the emergence of this model, TPACK has been applied to a variety of content areas: English (Hughes & Scharber, 2008), Literacy (Schmidt & Gurbo, 2008), Social studies (Lee, 2008), Mathematics (Grandgenett, 2008), Arts (DePlachett, 2008), Science (McCrorry), Physical Education (L.E. Kelly, 2008), as well as a framework for within and between multiple curriculum areas (M.A. Kelly, 2008).

Schmidt and Gurbo (2008) explored how the TPACK model might be applied to teaching literacy in elementary or primary classrooms. Whilst acknowledging that literacy “is a complex and multifaceted concept” (p.64) which made it difficult to define the Content Knowledge (CK) required by teachers, they referred to experts in the field who had based their findings on rigorous, evidence based research (International

Reading Association, 2004; Moats, 1999; National Reading Panel, 2000; Snow, Griffin & Burns, 2005). From the literature they nominated frequently occurring areas: “language structure, vocabulary, comprehension, fluency, and composition” (Schmidt & Gurbo, 2008, p.64). Similarly, in the case of reading in Australian contexts, the National Inquiry into the Teaching of Literacy (DEST, 2005) drew on evidence-based research to recommend an integrated approach to reading with the explicit teaching of phonemic awareness, phonics, fluency, vocabulary knowledge, and comprehension, and the literacies of new technologies.

In order to transform this content knowledge, the National Inquiry into the Teaching of Literacy (DEST, 2005, p.29) stated that quality teaching requires Pedagogical Content Knowledge (PCK) which includes: “knowledge of how students learn to read, how to assess reading proficiency and growth, knowledge of how to use assessment information to apply the appropriate strategies from a repertoire of practices that are effective for teaching students to read”. This content knowledge needs to relate to “*what* works, *why* it works, and *how* it works” (DEST, 2005, p.29).

Technological Content Knowledge (TCK) is concerned with how technology has changed the way literacy is taught. As Swenson, Rozema, Young, McGrail & Whitin (2005) have emphasised technology has changed how people interpret and construct texts. The multimodality of new texts has impacted on the types of strategies and approaches required (Coiro, 2003; Sutherland-Smith, 2002). As a form of literacy knowledge, this knowledge is paramount to success in a knowledge society (Leu, 1997). Planning for this type of *Technological Content* Knowledge (TCK) may enhance literacy opportunities for students who may have limited access to technological resources in their home lives (McGill-Franzen & Lanford, 1994).

*Technological Pedagogical Knowledge* (TPK) for literacy was not explicated by Schmidt and Gurbo (2008), however, in apply Mishra and Koehler’s (2006) general definition of this knowledge, this would entail knowing when to use particular technologies, strategies for using the technologies’ affordances, and how to teach with technologies. In this study, such knowledge would include ‘how’ to teach the “what” of Multiliteracies, and include a focus on Multiliteracies pedagogy (Cope & Kalantzis, 2000) as a way to structure learning.

The recognition and requirements of the different types of knowledge as suggested by Mishra and Koehler (2006) has implications for professional development

for teachers. Professional development needs to go beyond the teaching of technology skills in isolation to include those skills that support pedagogical approaches related to content areas. However, Higgins and Moseley (2001) acknowledged the need to account for teachers' beliefs and practices in realising effective changes to pedagogy through professional development. Further they emphasised that "An important component in this process is information about pupils' progress so that beliefs about effective practices generally, and about the effective use of ICT in particular, are grounded in the impact that such beliefs and practices have on pupils' learning".

### **Teacher Beliefs**

Distinctions between teacher knowledge and beliefs have been recognised in the research literature (Calderhead, 1996; Fenstermacher, 1994; Richardson, 1996; Thompson, 1992). However, Pajares (1992, p.307) after reviewing the literature on beliefs labelled it as a "messy construct" stating that "the difficulty in studying teachers' beliefs has been caused by definitional problems, poor conceptualisations, and differing understandings of beliefs and belief structures". Part of the challenge in defining beliefs has related to the distinction between beliefs and knowledge. For the purposes of this study, I acknowledge the distinction made by Calderhead (1996, p.715): Whereas beliefs generally refer to "suppositions, commitments, and ideologies", knowledge refers to "factual propositions and understandings". This fits with a radical constructivist epistemological view as after gaining knowledge of a proposition, humans are free to accept it as true or false (i.e., believe it or not), in light of their prior experiences. Nespor (1987) distinguished between knowledge and beliefs, noting that stronger affective and evaluative components are often associated with beliefs. With this in mind, numerous researchers (Griffin & Ohlsson, 2001; Kagan, 1992; Nespor, 1987; Pajares, 1992) have acknowledged the influential place of beliefs over knowledge in determining the organisation and definition of problems by individuals. This makes beliefs a stronger indicator of behaviour.

Pajares (1992, p.314) proposed that "All teachers hold beliefs, however defined and labeled, about their work, their students, their subject matter, and their roles and responsibilities". In relation to technology, Zevenbergen and Lerman (2007, p. 853) contended that "the values and beliefs that teachers hold about pedagogy and/or technology mediate the ways in which they will use such technologies." Trumball

(1987) revealed that at times teachers' beliefs can limit their ability in managing pedagogical problems they may encounter. Ertmer (2005) emphasised that the ultimate decision about how, why and when to use technology in the classroom is reliant upon teachers and has called for the need to examine teachers' beliefs about teaching, learning and technology. In spite of a plethora of research on factors affecting teachers' use of technology, Zhao, Pugh, Sheldon and Byers (2002, p.483) commented that "these types of studies tend to neglect the messy process through which teachers struggle to negotiate a foreign and potentially disruptive innovation into their familiar environment"

### **Espoused and Enacted Practice**

Wilkinson (2005) noted that teachers usually have theories in relation to teaching and learning influencing what they do and why they do it. However, Willhelm, Baker, and Dube (2001, p. 1) stated that "these theories are typically underarticulated, unrecognized, underspecified, and quite often inconsistent if not schizophrenic in their application." Argyris and Schon (1974) made distinctions between notions of congruence and incongruence between *theories-in-use* (enacted practice) and *espoused* theories. They asserted that people have cultural matrices or maps which guide how they plan, implement or review their actions. Enacted practice or theories-in-use can be distinguished from espoused theories which are used to describe or justify behaviour under certain circumstances. They are the "theory of action to which he gives allegiance, and which, upon request, he communicates to others" (Argyris & Schon, p. 7). Argyris and Schon believed an individual's theories-of-use (enacted practice) may not be congruent with espoused theory. Further, there may be unawareness of this lack of congruence. They emphasised that this "blindness to incongruity between espoused theory and theory-in-use may be culturally as well as individually caused and maintained" (p. viii). Some researchers have reported inconsistencies between teacher beliefs and their classroom practices (Calderhead, 1996; Ertmer, Gopalakrishan, & Ross, 2001; Fang, 1996; Kane, Sandetto, & Heath, 2002). In light of these inconsistencies, Fang (1996) suggested that contextual factors interfered with teachers's abilities to consistently apply their beliefs about reading practices. Ertmer et al., (2001) found a similar situation in relation to classroom technology use. Ertmer (2005, p.29) emphasised that researchers need to "account for, the potential influence of these types of contextual factors when

examining teachers' beliefs or promoting teacher change". Mumby (1982, p.216) proposed that when a teacher's beliefs about a particular subject area are inconsistent with their practice, it may be that "different and weightier beliefs are the cause". Ertmer (2005, p.29) proposed that in such cases that researchers need to explore any contradictions "to determine which beliefs, exactly, are influencing which actions". Pajares (1992), whilst not discrediting inconsistencies found by researchers, suggested they illustrated the difficulty in trying to measure such beliefs, due to their tacit form. After explicating teachers espoused theories, Argyris & Schon (1974, p. 4) asserted reflection was paramount to effectively teaching with the "need to become competent in taking action and simultaneously, reflecting on this action to learn from it". The distinction between espoused and enacted practice is of significance to this study, as the goal of integrating technology such as the IWBs into the curriculum is to facilitate the use of technology that leads to increased student learning. As emphasised by Pajares (1992, p.327) "little will have been accomplished if research into educational beliefs fails to provide insights into the relationship between beliefs... and teacher practices, teacher knowledge, and student outcomes".

### **Digital Schools**

In this review it has been established that teacher beliefs, practice and knowledge, rather than IWBs needs to be driving factor in teaching and learning with technology. However, Kent (Principal of Richardson Primary School) further suggested that "it is not just the teacher, it is the school" (2008, p. 12). With this in mind the school environment needs to be conducive to the implementation of Interactive Whiteboards to ensure that learning and teaching is effective. Kent (2003) suggested the following traits need to be evident: commitment from school leadership; multiple boards or users to ensure early skills are developed through professional reflection or sharing; permanently fixed Interactive Whiteboards to allow access to the IWB for the majority of teaching time; time for sharing and reflecting and; digital input with access to a variety of digital resources such as a scanner, digital camera and access to the Internet.

Glover and Miller (2004) investigated how change with IWBs was introduced and how it impacted on the whole-school in a range of primary and secondary schools in the United Kingdom. They identified a typology of users among classroom teachers



based on their attitudes towards change. There were three groups: *Missioners*, *Tentatives*, and *Luddites*. *Missioners* were those who applied it fully to their teaching, were developing ongoing skills, and actively encouraged colleagues to use the IWB. *Tentatives* were those who had access to IWB technology, however, were in some way inhibited to apply it on a daily basis in classroom settings. *Luddites* were those who in spite of training and access to IWB technology were opposed to its use.

Glover and Miller (2003) also classified the viewpoints of headteachers or principals, although they acknowledge their sample of participants for these classifications were small. Three viewpoints emerged: *Revolutionaries*, *Gradualists*, and *Reactionaries*. *Revolutionaries* were convinced of the value of the IWB technology. They planned for change, undertook missioner activity, making all staff aware of their goals. *Gradualists* recognised the need for change, but were constrained by financial considerations and undertook a slower approach to instigating change. *Reactionaries*, on the other hand, doubted the value of the IWB technology, and used current or potential resourcing problems as a way of deferring change.

This similar classification also applied to the leadership of schools investigated. Glover and Miller (2004) suggested that this typology can be applied to the introduction of IWBs. They found that the use of IWBs by *Missioner* teachers can “inspire a groundswell of teacher opinion” and that “the missioner activity of one or two persuasive teachers” had considerable effect (p. 6). Further, school leaders, who were but not always *Revolutionaries* or *Missionaries*, appeared to have a strategic plan for IWB use and justified expenditure in relation to their use. Glover and Miller (2004, p.9) concluded that “the interplay between leadership and classroom teachers is the force that conditions the pace, extent and impact of change”. They identified four patterns of change in school contexts based on interactions between teachers and headteachers. These were: peer persuasion, driven, chance and inertia. In primary settings Glover and Miller (2003) found that one convinced missioner teacher had been sufficient to prompt change

Other literature has acknowledged the “powerful effect” of school leaders who are actively engaged in the process of ICT integration and provision of a supportive school culture (Hayes, 2007; Hayes & Harriman, 2001; Schuck & Kearney, 2007). Schuck and Kearney (2007) in a case study of six Australian schools also found there were common characteristics of the school culture that appeared to encourage

innovations in those schools. First, there were expectations by administration and teachers that all staff would use IWBs. The support of staff by each other was a factor that facilitated use, with a “culture of sharing” (p. 60) to support professional learning. Other factors Schuck and Kearney (2007) identified as supportive to IWB use were the expectations of students who are using the latest technologies themselves, a supportive parent culture, and professional development. Schuck and Kearney (2007) observed that professional development was often conducted by peers or by the school Principal.

Two aspects that were evident in the ICT literature were the existence of Technology Vision Statements, which sought to integrate computer-based learning with other elements of the school curriculum (Hayes & Harriman, 2001; Sherry, Billig, Tavalin, & Gibson, 2000), and a collaborative whole-school approach to implementation. The second, a collaborative process would involve both teachers and administrators, requiring “all teachers to be involved in the process; encouraging a sense of ownership and support for a smoother integration” (Hayes & Harriman, 2001, p. 6). Key findings from Hayes (2007) emphasised that there are “local variations and specificities of ICT integration” (p. 565) that “generates a unique set of context-bound challenges that require locally developed practical solutions” (p. 576). Hayes (2007) emphasised that “background design issues” need to be addressed before ICT integration can take place.

Lee and Gaffney (2008) suggested that to plan and realise preferred changes for a knowledge age, schools need to consider the constructs of *preferred* and *probable* futures proposed by Ellyard (1998). Preferred futures detail the deliberate actions that are needed to enact desired changes. Probable futures are what is expected to occur, essentially created by others. Lee and Gaffney (2008) offer concepts such as ‘helplessness’ and ‘reacting to events’ related to a probable future. In order to enact a preferred future, Lee and Gaffney suggested the use of a Crosby Grid (Crosby, 1980).

### **Summary**

The literature reported here related to three aspects important to the study under investigation. First, it has established the changing contexts in which literacy education is currently positioned. This notion acknowledges that multiple social, cultural, economic and technological influences shape our literacy practices. Further, it

has recognised the need for an approach that values the notion of multiple literacies or “Multiliteracies”. Second, it has looked at the central role of technologies, in particular IWBs, in the reshaping of these definitions. It has looked at their impact on teaching and learning. Third, it considered the type of interactive learning environments that can promote both learning and a Multiliteracies approach.

From this review, gaps in each area of literature have been identified, which this study sought to address. First, members of the New London Group highlighted that the Multiliteracies manifesto was not a final word, but was to initiate further conversation about what literacy pedagogy should entail. Cope and Kalantzis (2000) argued that it was a complex task, with Michaels and Sohmer (2000) relating this complexity to applying Multiliteracies pedagogy to different conditions and contexts. Both Michaels and Sohmer (2000) and Neville (2005) called for research that translated theory into practice, revealing the perspectives, voices and practices of teachers. Research in relation to how teachers adapt their pedagogy to incorporate multimodal texts into their literacy practice is something that has not been realised, with teachers continuing to privilege print texts (Kalantzis et al., 2005; Van Haaren, 2005). This study revealed the perspectives and voices of teachers, and the complexity of teachers’ practices as they used a variety of multimodal texts on a daily basis on IWBs. Furthermore, teacher beliefs were considered for congruence to enacted practice as the beliefs teachers hold about pedagogy mediate the ways in which they use technologies.

Both in ICT and IWB literature it is noted that using the technology is the driving force behind its implementation. It is only after teachers have utilised technology for a period of time that consideration of pedagogy comes to the fore. The early literature on IWBs highlights this process and it is evident in models of teacher integration with ICTS and IWBs. However, numerous authors highlighted the complexity of teaching and learning in a technology mediated contexts, calling attention to both content and pedagogy. Observations of teacher practice and investigation of teacher beliefs in this study provided case studies of this phenomenon.

Within the literature on IWBs, there is call for more research on the impact of IWBs on teacher practices and student learning. In particular, Bennett and Lockyer (2008) call for longitudinal studies that may explain how teachers change their practice as they adapt to IWBs. My study examined how one primary school and teachers within

it managed change with IWBs over a period of two years. Further, it considered the context-bound challenges of enacting a whole-school approach with IWBs.



## CHAPTER 3

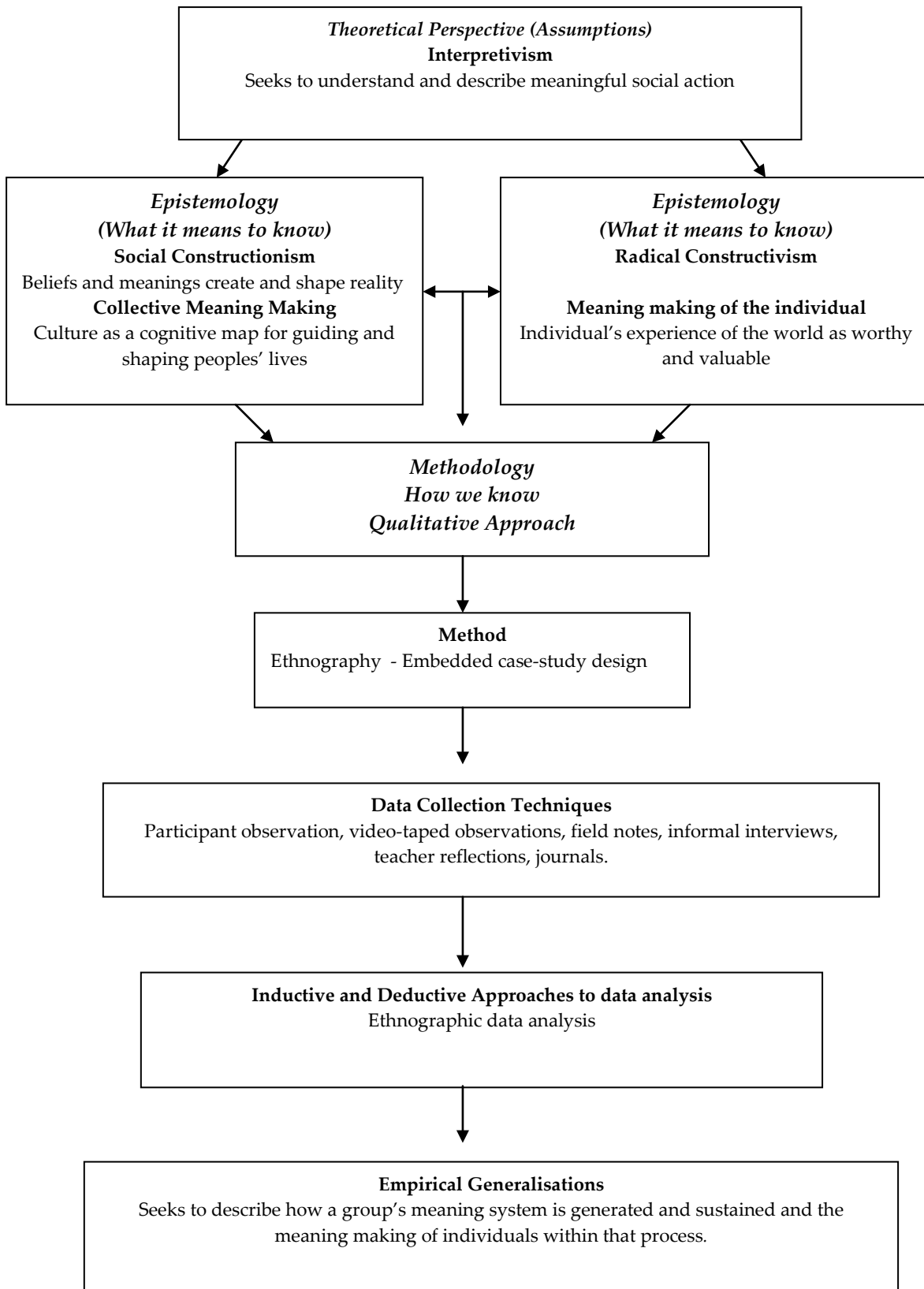
### METHOD

My goal in this study was to explore beliefs and practices in relation to literacy, IWBs and Multiliteracies. The following questions directed my exploration:

1. *How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?*
2. *How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?*

An ethnographic research approach with an embedded case-study design was used to address these questions. A qualitative approach underpins this design and methods used for data collection and analysis. I considered this approach appropriate due to its commitment to a naturalistic, interpretive practice. This qualitative reasoning is guided by two interpretive theoretical paradigms, that of social constructionism and radical constructivism (Glaserfeld, 1995.) Together the two provided an orienting framework that underpinned theoretical and methodological decisions and framed a capability for me which included interpreting and utilising “basic assumptions, key issues, models of quality research, and methods for seeking answers” (Neuman, 2006, p. 81).

Thus, they guided my clarity about what and why I was conducting this study, sharpening my sense of purpose, and my understanding of the nature of reality, the nature of human beings, of human agency, and of approaches to data collection and analysis that might apply an overview of the conceptual framework for my study which is provided in Figure 3.1. This chapter will explicate this conceptual framework, along with the methodological decisions made to address the research goals.



**Figure 3.1. Conceptual Framework for Study**

## **Rationale for the Approach and Methodology**

### ***Theoretical Framework for this Study***

Within the social sciences there is a range of approaches for the conduct and process of research, each with its own philosophical perspectives and principles. Thomas Kuhn (1970) referred to a perspective or set of principles as a *paradigm*, a term I have used to explain the amalgam of social constructionism and radical constructivism which has guided my decision on method. Neuman (2000) cited three main approaches or paradigms for social research as: (a) positive social science, (b) interpretive social science, and (c) critical social science. Crotty (1998) and others (Guba & Lincoln, 2005; Lincoln & Guba, 1985) proposed that there are four elements underlying all research paradigms which inform each other. These are (a) theoretical perspective or philosophical stance, (b) epistemology or theory of knowledge, (c) methodology or strategy, process or design, and (d) method or techniques or procedures used to gather data.

The particular theoretical perspective which has shaped my study is that of interpretivism (Neuman, 2000; Schwandt, 1994). This philosophical stance is based on particular assumptions which allowed me to uncover “culturally derived and historically situated interpretations of the social life-world” (Crotty, 1998, p.67) in relation to teachers and students within the classroom and school context. These assumptions will be elaborated in the following section.

### **Interpretivism (Theoretical Perspective)**

Interpretivism can be traced back to the thinking of German sociologist Max Weber (1864-1920). It is based on the notion of “Verstehen,” which seeks “empathetic understanding of the everyday lived experience of people in specific historical settings” (Neuman, 2006, p. 87). The purpose of conducting research from an interpretivist perspective then is to uncover how participants construct meaning in natural settings and to gain an understanding of their life-world. This “emic” point of view (Schwandt, 1994, p. 118) entails uncovering what is meaningful social action to those being studied as they experience their daily lives. This means looking beyond the external or observable behaviour to understand the subjective meanings of individuals, such as purpose and intent, motives and reasoning that guide a person’s actions and decisions.



As such, any construction of meaning or social reality for participants (individuals) is contextually situated. As Schwandt (1994, p. 118) highlighted, “particular actors, in particular places, at particular times, fashion meaning out of events and phenomena through prolonged, complex processes of social interaction involving history, language and action.” Social action on its own has little intrinsic meaning. Rather, meaning is constructed during social interaction among people who share a cultural meaning system. This meaning system provides a lens through which people interpret action as a socially appropriate action or sign. Further, this meaning construction is embedded in continuing iterations of communication and negotiation (Neuman, 2000, 2006).

From an interpretivist perspective, researchers are interested in discovering the meaning of actions for the people engaged in them. This entails considering how individuals define their actions, what they hold as significant, and what they believe to be authentic (Neuman, 2000). Interpretivists consider participants as having volition, with actions based on conscious, subjective choices and individual reasons, and shaped by the social setting. However, participants are able to create and change those settings and have the capacity to form a point of view. Interpretivists adopt a relativist approach, with no single perspective or point of view having preference over others. Rather, all perspectives are equally valid for those who hold them (Neuman, 2000). In my study this required trying to understand the inner world of teachers, their reasons, their points of view and the decision making processes that shaped literacy events.

Schwandt (1994) highlighted that terms such as interpretivist and interpretivism routinely feature in social science research; however, their particular connotations are fashioned by the researcher’s intent. This intent is reflected in the epistemology inherent in the theoretical perspective (Crotty, 1998). Epistemology concerns “the nature of knowledge, its possibility, scope and general basis” (Hamlyn, 1995, p. 242). Furthermore, “epistemology is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate” (Maynard, 1994, p. 10).

For this study, I have selected two complementary epistemologies which have their basis in an interpretative framework for human inquiry (Denzin & Lincoln, 1994; Neuman, 2006). They are social constructionism and radical constructivism (Glaserfeld, 1995). Each of these epistemologies has shaped my view of the nature of

knowledge, knowledge creation and “what it means to know” (Schwandt, 1994, p. 127). Thus when searching out data on teachers’ integration, I sought also to document the contexts that individuals reported to have framed their beliefs and practices.

Further, each epistemology implies particular ontological beliefs and notions of human nature and agency (Guba & Lincoln, 2005; Schwandt, 1994). Social constructionism acknowledges the collective meaning-making that occurs, whilst radical constructivism acknowledges the experiences of the individual as worthy. In the following section the epistemologies of constructionism and radical constructivism (Glaserfeld, 1995) are addressed separately to show how their epistemological and ontological views have fashioned my study, the reasons for their selection and their relevance to the topic under investigation.

### **Constructionism as Epistemology**

Constructionism is a philosophy that views “all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interactions between human beings and their world, and developed and transmitted within an essentially social context” (Crotty, 1998, p. 42). The social origin of meaning as part of the interpretive process for individuals is an important aspect for constructionism. According to Geertz (1973, p. 49) “a system of significant symbols” or culture, is what serves as a guide to human behaviour. These significant symbols may take the shape of language, words, gestures, drawings or anything that may be used to impose meaning on experience and behaviour. Crotty (1998) suggested that in viewing culture this way, these symbols are the outcomes of human thought and action.

From a constructionist point of view, reality is not discovered but rather meanings are constructed by human beings through engagement with the world they are interpreting. Meaning is not inherent in objects but emerges when consciously engaged with by individuals. Therefore, meaning or truth is not objective, with Crotty (1998) suggesting that it cannot also be described simply as subjective. Rather, constructionism epitomises the concept of intentionality or relatedness. This acknowledges that there is an interaction between the individual and the object, from which meaning is constructed. A constructionist point of view, rather than negating the object seeks to focus on it intently with it being “mediation with content” (Crotty, p. 52).

Within educational contexts Wortham and Jackson (2008) highlighted that there are various objects constructed in educational processes involving cultural, social, interactional and psychological elements. These include the identities of teachers and learners, the subject matter learned, and the social structures which are produced and reproduced. Further, Wortham and Jackson stressed that a constructionist approach to education is important for it allows educators to gain insight into and modify educational outcomes which may facilitate or limit these objects (e.g., identity, learning, and social stratification). As they specified;

Constructionist inquiries illuminate learners' identities and competence, distinctions between valued and devalued subject matter, and how the social organisation of schooling are constructed, and in doing so they may help education to better achieve its transformative potential. (2008, p. 107)

One area of constructionist educational research involves the construction of literacy. Literacy researchers in the US (Bloome, Carter, Christian, Otto, & Shuart-Faris, 2005; Gee, 1996), UK (Barton, 1994; Street, 1984), and Australia (Luke, 1993), have argued that literacy is a socially constructed process. From a social construction perspective, what counts as literacy is locally and situationally defined through the actions of members of a social group. For my research, I draw on the definition of social construction proposed by Castanheira, Crawford, Dixon and Green (2001), who argued that literacy is:

... a socially constructed phenomenon that is situationally defined and redefined within and across differing social groups ... What counts as literacy in any group is visible in the actions members take, what they orient to, and what they hold each other accountable for, what they accept or reject as preferred responses of others, and how they engage with, interpret and construct text. (p. 354)

This definition concentrates on multiple literacies, rather than a singular notion of literacy, as well as the variety of ways of engaging in literacy practices within and across social groups (Bloome et al., 2005; Castanheira et al., 2001; Rex, Green, & Dixon, 1997), and was a focal point of this study. Underlying the multiple literacies perspective is a view of literacy as both a construct of, and a cultural tool for the members of a social group to achieve both collective and individual goals and purposes (Lima, 1995). Within everyday interactions, group members are afforded and at times denied opportunities to construct and have access to the range of literate practices

deemed necessary to participate in socially and culturally appropriate ways. The range of an individual's literacy practices within this collective group is contingent upon opportunities made available to, and engaged in by the individual (Castanheira et al., 2001). Therefore, I sought to examine how multiple literacies were constructed through the interactions of teacher and students using an IWB.

The view of multiple literacies from a social constructionist framework is not a curriculum approach identified as Multiliteracies. Rather, it is a theoretical framework that guides inquiry into how such literacies are developed by particular groups, leading to a situated view of what counts as literacy. Thus, the social constructionist approach provides a way of constructing a grounded understanding of the literacy opportunities afforded students, and lays a foundation for exploring in what ways these practices were congruent with the teacher's beliefs and the Multiliteracies curriculum.

Central to this research is the argument by Bloome et al. (2005), that: "Cultural practices (and correspondingly, literacy practices) are not just held in the minds of the group but are also 'held' in the material structure and organization of a setting" (p. 50). Their argument highlights the multiple influences that shape cultural and literacy practices and the complex ways knowledge is constructed through these practices.

A constructionist approach advances a different perspective to that of an interpretive or naturalistic approach. Holstein and Gubrium (2008) proposed that one way of considering the differences between these approaches is in terms of what they call 'what' and 'how' questions. An interpretive or naturalistic viewpoint seeks to address "what is going on with and within social reality," whereas constructionism pose questions in relation to "how social realities are produced, assembled and maintained" (Holstein & Gubrium, 2008, p. 374-375.) In this study, a naturalistic or interpretive approach seeks to describe "what is going on" both in relation to Multiliteracies and IWBs at the classroom and school level. This is supplemented by a constructionist approach in order to understand "how" teachers and students construct Multiliteracies on a daily basis within a classroom environment mediated by IWBs.

A social constructionist perspective acknowledges the social dimension of meaning, with culture as a cognitive matrix that shapes individuals' lives. As such, this approach allows a more collective (Crotty, 1998) notion of literacy and multiliteracy as constructed in classrooms by teachers and students – a value that characterised my prospective data and their address of the research questions posed in the study. I

considered an additional epistemology, radical constructivism (Glaserfeld, 1995), as relevant in attempting to focus on the meaning making of the individual teachers and students. Schwandt (1994, p. 118) highlighted that social constructionism and constructivism both have embedded common beliefs and objectives of “understanding the complex world of lived experience from the point of view of those who live in it.” This similarity in the philosophy of both paradigms is what is important when considering blending two paradigms to gain an understanding of both world views. Whilst Guba and Lincoln (2005) issued a cautious response to the commensurability of paradigms, they suggested that interpretivist and constructivist paradigms merge together comfortably.

### **Radical Constructivism (Epistemology)**

The idea of knowledge as created by individuals witnessed the rise of “constructivism,” a philosophical perspective derived from the work of Kant. This perspective views “reality as existing mainly in the mind, constructed or interpreted in terms of one’s own perspective” (Harris & Hodges, p. 43). New understandings are developed when our current knowledge and beliefs interact with new experiences. These new experiences are either interpreted in line with our prior knowledge or if disequilibrium occurs, new rules are created to accommodate this new experience.

Glaserfeld (1995) advanced a cognitive perspective of constructivism originating from the work of Piaget (1970), who viewed knowledge construction as exclusively being in the mind of the individual. However, he has referred to his approach as a theory of knowing, rather than a theory of knowledge or epistemology. Glaserfeld (1995, p. 1) felt these terms implied a notion whereby “novice subjects are born into the ready-made world, which they must try to discover and ‘represent’ to themselves.” As such it is not an approach which claims to provide a definitive image of the world. Rather, it espouses to be:

... no more than a coherent way of thinking that helps to deal with the fundamentally inexplicable world of our experience, and most important perhaps, places the responsibility for actions and thoughts where it belongs: on the individual thinker. (Glaserfeld, 1995, p. 19)

With this in mind, Glaserfeld (1995) outlined radical constructivism’s two essential principles as:

- knowledge is not passively received but built up by the cognizing subject;
- the function of cognition is adaptive and serves the organization of the experiential world, not the discovery of ontological reality. (p. 18)

Further, he stated that:

What we make of experience constitutes the only world we consciously live in. It can be sorted into many kinds, such as things, self, others and so on. But all kinds of experience are essentially subjective, and though I may find reasons to believe that my experience may not be unlike yours, I have no way of knowing that it is the same. The experience and interpretation of language are no exception. (Glaserfeld, 1995, p. 1)

In a subsequent publication Glaserfeld (2002) proposed two key points that are central to a radical constructivist approach and relevant for this study. First, even though people may have the same experience of an event, the knowledge constructed may be different. New knowledge gained from reflection upon practice and discussion may result in different teaching practices of participants if this new knowledge is not assimilated into their existing teaching frameworks or belief systems.

Second, prior knowledge and experience determine our understanding of the world. Information is either assimilated into our existing constructs or accommodated with modifications made to fit into existing frameworks or schemes. Knowledge is kept or discarded by individuals if it is deemed viable or useful at the time or in the future. This is important in considering what teachers value in their classroom or what may have worked in the past.

In conclusion, the theoretical frameworks of constructionism and radical constructivism provide a theoretical orientation for my study and together provide access to collective and individual knowledge of participants. Drawing on these themes as accounts of how knowledge is constructed, I recognise that my inquiry is grounded in an interpretivist framework. This framework has guided the choice of methods that will best achieve the aims of my study and will subsequently inform data collection and the process used to collect it, the approach to data analysis, as well as the type of findings sought.

As a researcher from an interpretivist perspective, data collection methods needed to provide immersion in the setting under study, with a view to capturing the subjective experiences and perspectives of those being investigated. A qualitative or naturalistic approach to research which has been equated with an interpretive approach

(Crotty, 1998; Denzin & Lincoln, 1994, 2000, 2005; Neuman, 2000, 2006; Schwandt, 1994) has been selected for “seeking answers” (Neuman, 2006, p. 81).

A naturalistic approach provides “interpretation in context and depth of understanding” (Shaw, 1978, p. 13) of phenomena as teachers enact multiliterate practices within a complex classroom environment mediated by technology. Qualitative methods allow for a holistic overview of the context under study, in particular its logic, arrangements and cultural practices over a sustained period of time (Miles & Huberman, 1994). Further, they provide knowledge of how people “come to understand, account for, take action and otherwise manage their day to day situations” (Miles & Huberman, 1994, p. 7). One such method which has served my research purpose and is often equated as synonymous with a naturalistic approach is ethnography (Hammersley & Atkinson, 1995; Holstein & Gubrium, 2008). However, ethnography can also be framed by a constructionist agenda. In this study, naturalistic approaches allow for descriptions of “what” is going, and constructionist approaches seek to address how social realities are produced, assembled, and maintained (Holstein & Gubrium, 2008).

### ***Ethnography***

There are many definitions of the term ethnography and great diversity within these definitions. However, what makes it more than qualitative research is that it goes beyond describing and extends to the interpretation of cultural behaviour (Anderson-Levitt, 2006; LeCompte & Schensule, 1999; Woolcott, 1980). Further, numerous researchers have asserted that ethnography is more than a method (Anderson-Levitt, 2006; Brewer, 2000; Heath & Street, 2008; Pole & Morrison, 2003; Wolcott, 1999). Rather, ethnography is a methodology grounded in theoretical orientations from particular social science disciplines such as sociology and anthropology and their subfields, such as linguistics. “Sociology and anthropology are disciplines that, are born out of concern to understand the ‘other,’ are nevertheless also committed to an understanding of the self” (Denzin & Lincoln, 1994, p. 24). Atkinson, Coffey, Delamont, Lofland and Lofland (2001) made the point that diversity in the meaning of the term ethnography can also relate to national contexts in which they are conducted.

Whilst ethnography considered from an anthropological grounding focused on uncovering cultural aspects of tribes or groups of people, Spradley and McCurdy’s

(1972) collection of the ethnographic essays of their undergraduate students, titled *The Cultural Experience*, heralded what Wolcott (1999, p. 35) called the “New Ethnography”. This new approach brought the notion of ethnography to a wider audience broadening the notion of culture to incorporate the study of the aspects of everyday life or “recurrent social situations” (Spradley & McCurdy, 1972, p. 24).

Ethnography is a suitable method to use in educational settings and both anthropological and sociological ethnographies have been conducted in Australia and other international contexts including Britain, Canada, Europe and the United States (Castanheira et al., 2001; Freebody, 2003; Gordon, Holland, & Lahelma, 2001; LeCompte & Preissle, 1993; LeCompte & Schensule, 1999; Pole & Morrison, 2003; Vidich & Lyman, 1994). Fetterman (1998, p. 9) pointed out that “In many applied settings, long-term continuous fieldwork is neither possible nor desirable” as it is time-consuming and the process involves longer term, face-to-face interactions with research participants (LeCompte & Preissle, 1993; LeCompte & Schensule, 1999; Pole & Morrison, 2003).

Ethnography has an intensive and contested history of more than three decades investigating a range of topics from school and program evaluations, ethnic and class differences, to classroom interaction and processes to name a few, from a variety of theoretical and conceptual approaches. While there is great diversity among ethnographic traditions and debate over what constitutes an ethnography (Agar, 2006; Roth, 2006) some authors have suggested there are common features which they share (LeCompte & Schensule, 1999; Atkinson et al., 2001; Green, Dixon & Zaharlick, 2003). LeCompte & Schensule (1999, p. 9) listed the seven features of ethnography as:

1. Carried out in natural settings
2. Intimate face-to-face interactions with participants
3. Presents an accurate reflection of participants’ perspectives and behaviours
4. Inductive, interactive and recursive data collection and analytic strategies to build local cultural theories
5. Multiple data sources
6. Frames all human behaviour and belief within a socio-political and historical context
7. Concept of culture as a lens through which to interpret results

Green et al. (2003, p.205) suggested that other key principles of ethnography are: “demanding a contrastive/comparative perspective; and entailing a holistic perspective.” They further suggested that these principles underlie a range of theoretical



stances and can be seen as constituting “*logic-of-inquiry*” for research grounded in a cultural anthropology and ethnography of communication approach. For ethnographers conducting research, the process of collecting data and making ethnographic records and simultaneously analysing data is an interactive and responsive process. This interactive-responsive approach to data collection and analysis, guided by the principles establish the ethnographer’s “*logic-in-use*.”

One of the main criticisms of ethnography and other qualitative approaches in relation to their validity as an approach to research relates to the quality of the knowledge produced (Pole & Morrison, 2003). More generally, the credibility and value of knowledge gained through most educational research has been questioned and continues to be scrutinised in local, national and international educational arenas (G.J. Kelly, 2006; Lagemann, 2000). This increased scrutiny has generated various reports in international contexts investigating the need for evidence-based research in education (National Research Council, 2002) and providing guidelines for reporting empirical social science research in education (American Education Research Association, 2006). In particular in the area of literacy-education, future pedagogy in Australia is based on such evidence-based research (Department of Education, Employment and Workplace Relations, 2007; State of Victoria Department of Education and Early Childhood Development, 2007).

The National Research Council stated that:

The features of education, in combination with the guiding principles of science, set the boundaries for the design of scientific education research. The design of the study does not make the study scientific...To be scientific, the design must allow direct, empirical investigation of an important question, account for the context in which the study is carried out, align with a conceptual framework, reflect careful and thorough reasoning, and disclose results to encourage debate in the scientific community. (Shavelson & Towne, 2002, p. 6)

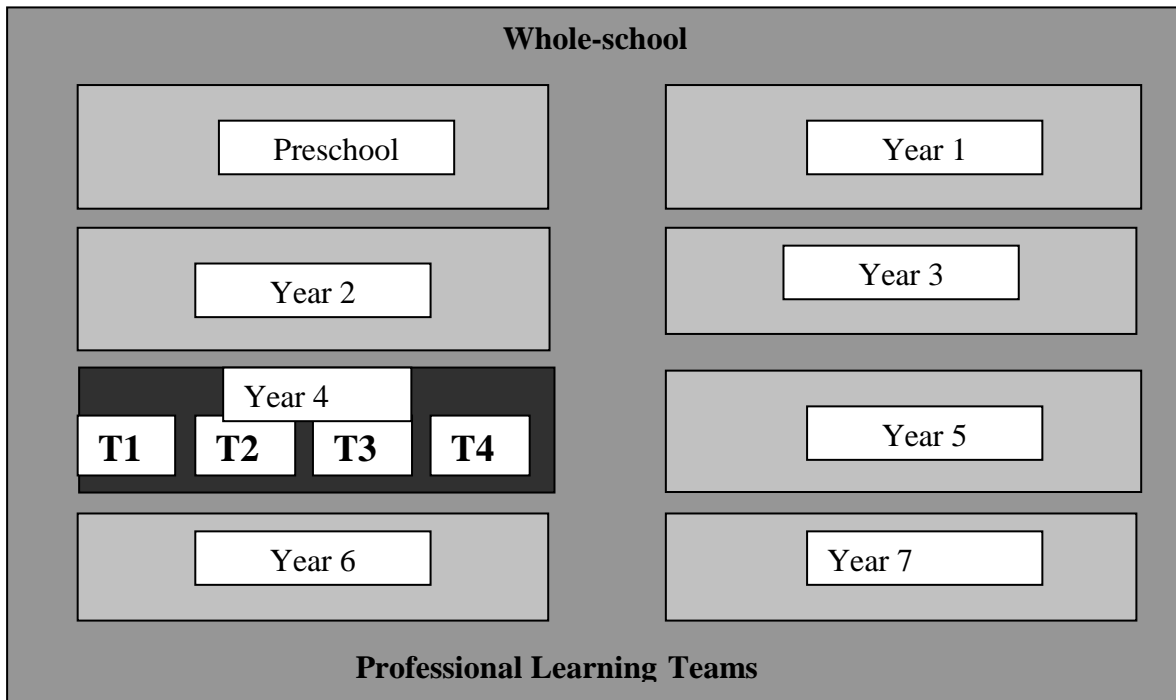
In their inquiry, Shavelson and Towne (2002, p. 98) describe ethnography as a “frequently used and trusted design” for addressing and providing a description of localised educational settings such as the one addressed in this study. Further, “this type of scientific description can provide rich depictions of the policies, procedures, and contexts in which the school operates and generate plausible hypotheses for what might count for its success”(p. 106).

Through applying an ethnographic approach, embedded with social constructivism and radical constructivist viewpoints, I sought to discover the cultural behaviours, knowledge and artefacts that participants used when engaging in their daily life within both the classroom and school context. This entailed discovering both the explicit and tacit cultural knowledge that enabled participants to interpret experiences and generate behaviour in relation to multiliterate practices with the IWB (Anderson-Levitt, 2006; Spradley, 1980). It also involved identification of the full range of literate resources used by members of the class, including an exploration of how the resources were used and with what outcomes. LeCompte and Schensule (1999, p. 82) made the point that “ethnographies are culturally informed case studies.” With this in mind, the goals of this study were achieved through applying an embedded case-study design.

### ***Embedded Case-study Design***

Yin (2003) suggested that a case-study approach is appropriate when the context cannot be separated from the phenomenon under study. In this instance the phenomenon of Multiliteracies cannot be separated from the context created by the IWB. A previous review of the literature guided the purposive sampling of cases or units, with the selection of a school with a whole-school implementation of IWBs and an interest in developing their pedagogical practice in relation to a Multiliteracies focus.

An embedded case-study design was used to bound the units of analysis and for focusing the case-study inquiry. The main unit of analysis was the whole-school setting, the intermediary unit a professional learning team (or year level) and the sub-units of analysis were the individual teachers within this professional learning team (see Figure 3.2). Yin (2003, p. 46) suggested that having smaller units or sub-units provide “significant opportunities for extensive analysis enhancing the insights into the single case.” Miles and Huberman (1994) suggested that sub-units provided an opportunity for repeated, constant comparison. A more focused analysis of one teaching team and the teachers within allowed for a more intensive investigation of the collective construction of knowledge in the classroom, and the purpose, intent and reasoning behind teachers’ daily decisions. Yin highlighted that each unit of analysis calls for a slightly different research design and data collection strategy. This was reflected in the use of different data collection techniques from surveys to video-taped field observations and teacher reflections.



**Figure 3.2. Embedded Case-study Units within this Inquiry**

The role of case-study research in education has a well established grounding with its contribution to educational research recognised by various sources (Becker, 1992; Merriam, 1988; Stake, 1995; Yin, 1994). Furthermore, it can contribute to an understanding of both theoretical and pragmatic practices in education (Stake, 1988). A case-study approach provides an opportunity to gain in-depth understanding of the situation and the meaning for the participant through access to subjective factors such as thoughts, feelings and desires (Merriam, 1988; Bromley, 1986 cited in Merriam, 1988). An interpretive case-study, as described by Merriam (1988), uses descriptive data to build a description of what is “going on” and then uses these data to develop conceptual categories to describe both common characteristics and different approaches to the phenomenon (Bouma, 2000; Merriam, 1988). These have then allowed for empirical and analytical generalisations (Brewer, 2000; Stake, 1998; Yin, 2003).

## **Research Approach and Design**

### ***Site***

This ethnographic study was situated in a co-educational, government, primary (elementary) school in Logan City, Queensland, Australia. The school which was established in 1978 is situated in a low socio-economic area and serves families and the community from the local area. It has significant numbers of students with special educational needs and students with home languages other than English. This site was selected as a case for study as it was at the time, one of a few schools in Australia to have a whole-school implementation of IWBs planned.

### ***Participants***

After identification of a site for this study, preliminary participants were all of the teaching and administrative staff of the school identified in the research site. During an initial exploration of the site, purposive sampling (Patton, 1990) was used to select further participants for an extended in-depth investigation. As this school works professionally in teams of teachers, one year level of teachers was sought for participation in the study. Letters of participation were sent out to all teaching staff which stated the level of involvement and participation required and requested participants. One teacher, Janelle, indicated her interest in participating in this study and the other teachers in her team were approached for their participation. This led to the subsequent selection of the Year 4 Professional Learning team and the students in their classes. One variation important to my research was the structural change initiated by the Principal to create a Learning Team consisting of one Year 3 teacher and three Year 4 teachers. This was a structural accommodation caused by a change in student numbers on the census day for all Queensland schools. In spite of this variation, this team of teachers was referred to as the Year 4 Professional Learning Team by school administration, and in this thesis they will also be referred to as the Year 4 Professional Learning Team. This particular teaching team contained two experienced teachers and two recently graduated teachers or novice teachers. Initially, Janelle was first to participate in this study in Term 1, 2006 with the three remaining members of the team commencing in Term 2, 2006.

## *Phases of the Study*

The study was conducted over a two year period from Term 1 until Term 4, 2005 and Terms 1 to Terms 4, 2006. It evolved over two distinct phases which sought to provide information in relation to the units of analysis and questions and goals of this study. Phase 1 involved an initial exploration of the school site to determine the history behind the whole-school implementation of IWBs and their use. Phase 2 entailed a more time-intensive study of the school and in particular, detailed data collection from one professional learning team or year level, and the teachers within this year level.

### **Phase 1**

Phase 1 was an exploratory investigation or “reconnaissance” (Wolcott (1999, p. 31) of the whole-school level at the invitation of the Principal. Approval was granted by the Principal to conduct research. Wolcott (1999, p. 208) proposed that ethnographic reconnaissance or “getting one’s bearings” should be a vital part of fieldwork, particularly at the commencement of any study. Whilst this term has some military connotations which may prejudice some readers, Wolcott (p. 208) highlighted it allows researchers to orient to the field, thus making “a better-informed decision as to whether or how to proceed with a more thorough investigation.”

This initial phase of the study was also concerned with conducting ethno-historical research which sought to relate how the social past of the school related to its social present in regards to literacy and technology use. Heath (1982) suggested that ethno-historical research is an essential characteristic of an ethnographic approach and that this holds true for educational settings. “Only by knowing the context provided by the ethnohistorical past, and by having an adequate accounting of the individuals, activities and relationships involved in the events of formal education can researchers know the internal and external conditions that relate to processes of change” (Heath, p.44). Furthermore, it was relevant in determining the background of particular themes, in this case, the school’s interest in providing technologically rich classroom environments and their future goals. The data collection techniques that were used to gather this information are detailed in the next section.

### ***Data Collection: Phase 1***

Data were collected over three periods during 2005: Term 1, Term 2 and Term 4, 2005 using methods of data collection consistent with the conceptual framework of this study. Table 3.1 shows the data collection periods, the quantity and type of data collection and the unit level these data address.

**Table 3.1. Data Collection: Phase 1**

<b>Data Collection Periods</b>	<b>Data Collected and Quantity</b>	<b>Unit Level Data Addresses</b>
<b>1. How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?</b>		
Early 2005 (March, 2005)	Video Artefact (1) Observations – Field Notes (4) Teacher Interviews (3)	Teacher Level (Year 1, 4, 7)
Mid 2005 (June, 2005)	Professional Learning Team Reports (8)	Whole-school Level Year Level
Late 2005 (November/December, 2005)	Teacher Questionnaire – IWB (20) , Administration Surveys – IWB (1),	Whole-school Level Year Level ( Prep to Yr 7 )
<b>2. How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?</b>		
Late 2005 (November/December, 2005)	Administration Interview (1) Video-taped Observations (3) Photographic Data (Classroom Environment) (3) Teacher Interviews (3)	Teacher Level (Year 1, 5, 7)

A variety of “interactive methods and non-interactive” (LeCompte & Preissle, 1993, p. 159) methods were employed. LeCompte and Preissle (1993) proposed when considering choice of techniques and their outcomes it is important to make a distinction between these method types. Interactive methods involve an interaction between the researcher and participants, which may produce affective reactions and which may impact upon the data collected. Non-interactive methods, on the other hand, require little or no interaction between the researcher and participants (LeCompte & Preissle).

Having said this, however, LeCompte and Preissle (1993) pointed out that in the practice of conducting ethnographies that the interaction between the researcher and

participants can vary, with movement between extremes of passive and active participation and observation. They further highlighted that “to an extent, then, all qualitative and ethnographic methods of collecting data are interactive” (p. 160). Mason (1996) believed that characterising data in such opposing terms fails to acknowledge the process of generation which occurs as the researcher interacts with passive or non-interactive raw data. This view is relevant to the notion of data generation which is closer to a social constructionist perspective, in which data generation is dependent upon the researcher’s part in the process (Pole & Morrison, 2003).

In order to provide information in relation to the whole-school or macro level (Fetterman, 1998), data collection during Phase 1 (Table 3.1) entailed a collection of school artefacts such as video artefacts, reports from Professional Learning Teams, an interview with the school Principal, and two survey instruments. These survey instruments were coded in such a way that allowed access to information in relation to the different year level of teachers. This was also supported by a variety of classroom field observations (participant observation) some which were video-taped, and semi-structured interviews with teachers from a range of year levels. These classroom observations and teacher interviews were also able to provide insight into the micro level of the classroom and how individual teachers enacted multiliterate practices in their classrooms. Each of the techniques used: participant observation, interviews, artefacts and survey instruments will be discussed for their relevance to this study in seeking to provide knowledge about teacher beliefs and practices both at a collective and individual level.

### **Participant Observation**

Participant observation is one of the Principal data collection techniques used by ethnographers and is essential to successful fieldwork (LeCompte & Preissle, 1993; LeCompte & Schensule, 1999; Pole & Morrison, 2003). However, it is a challenge to balance both of the two activities as the term implies that of participating and observing. As LeCompte and Preissle (1993) pointed out, focusing on observation diminishes the ability of the researcher to participate fully in events. On the other hand, participating fully can impede the researcher in documenting observations which have scope and depth. There are variations in the level of participant observation or the role of the researcher. LeCompte and Preissle commented that these relates to “matters of degree, not of kind” (p. 204). Denscombe’s definition, as below, summarised the role that I

undertook during this study which allowed me to be immersed in the school site with long-term contact with the participants (Emmerson, Fretz, & Shaw, 1995; Fetterman, 1998).

Participation as observer, where the researcher's identity as a researcher is openly recognized – thus having the advantages of gaining informed consent from those involved – and takes the form of 'shadowing' a person or group through normal life, witnessing first hand and in intimate detail the culture/events of interest. (Denscombe, 1998, p. 150)

This intimate and prolonged engagement with participants allowed me to personally experience “how people grapple with uncertainty and confusion, how meanings emerge through talk and collective action, how understandings and interpretations change over time” (Emerson et al., 1995, p. 4). These observations were documented both as written field notes and video-taped observations. Emerson et al. (1995, p. 4) pointed out that even with lengthy immersion in the site, researchers never become a bona fide insider, and thus observations reflected events “not as real-life but as objects of possible research interest.”

As such written field notes “are written accounts that filter members' experiences and concerns through the person and perspective of the ethnographer” and “provide the ethnographer's, not the members' accounts of the latter's experiences, meanings and concerns (Emerson et al., 1995, p. 13). These written field notes or what Clifford (1990) refers to as inscriptions sought to record the interactions and activities of the researcher and participant. In some instances where observation rather than participation was more dominant I engaged in transcription, recording as much detail as possible including any phrases uttered by participants. Later upon leaving the field, these inscriptions and transcriptions were typed up, and built upon with greater description being added. Personal reflections on field notes in relation to the interactions, texts used, teaching practices used, or to the method and theory related to the observation were also included.

Audio-taping, video-taping, photographic images and screen shots from the IWB provided a supplement to some of the written field notes. Photographic images were used to record artefacts, the classroom setting and activities participated in and allowed a record to prompt my memory. Screen shots allowed a more focused analysis of artefacts used by teachers and students. Schensule, LeCompte, Nastasi, and Borgatti



(1999) proposed that the main advantage of video-recording is that it is a permanent record, which can provide a more broadened range of behavioural data, in particular non-verbal behaviours.

Mehan (1979) argued that data collection techniques which record observations should be used to record as much of the observation as possible, maximising and preserving the raw data. This allows for subsequent revisiting of the data for analysis purposes and for confirmation of the reliability of my conclusions by other researchers and critical friends. Whilst all of these technologies have such advantages, they also came with disadvantages and issues which needed to be addressed. In particular, decisions needed to be made about what content to record, where to place video-cameras, how to deal with technological issues such as glare, how to minimise reactive behaviours and how and what to transcribe.

### **Interviews**

Participant observation is not sufficient to reveal a full picture of the topic being investigated (Pole & Morrison, 2003). With this in mind, structured and semi-structured interviews were used. During the conduct of ethnographic research Hammersley and Atkinson (2007) suggested that interviews can vary from informal conversations to more formal interviews. Interviews are considered another tool central to an ethnographic approach (Schensule et al., 1999). In Phase 1, six teacher interviews were conducted with informants providing a scope and range of year levels. During the early implementation of IWBs in Phase 1, only selected teachers were using IWBs so choice of interviewees was narrow. Semi-structured interviews were conducted with three teachers. By the later stage of Phase 1 when there was a whole-school implementation, semi-structured interviews with three teachers sought to explore the concept of Multiliteracies. In Phase 2, structured interviews and informal conversations with four teachers allowed for the concept of Multiliteracies to be explored in somewhat greater detail. These interviews provided access to teachers' implicit beliefs which were then compared to observations of their teaching practice.

Informal conversations with teachers were tools that allowed for verification of my observations and allowed for triangulation. Marland (1995, p.133) explained that "implicit theories cannot be studied until they are first made explicit...asking teachers to articulate their implicit theories involves them in a process of discovery...Finding

appropriate and valid ways of making implicit theories explicit is therefore a methodological challenge”. He (1995) suggested interviews as one such method to access teachers’ implicit beliefs.

### **Artefacts**

A variety of artefacts was collected during both phases of this study. These were: photographic data, video artefacts, teacher-created artefacts, teacher reflections and emails, and teacher planning documents. They were selected in order to address the questions of the study as well being “material manifestations of cultural beliefs and behaviours” (LeCompte & Preissle, 1993, p. 216). This variety of artefacts provided raw data which allowed access to participants’ experiences and knowledge and which suggested opinions, values and feelings. Further, they provided information about those who created them and contextual factors that influenced their development (Pole & Morrison, 2003).

### **Survey Instruments**

LeCompte and Schensule (1999) and Pole and Morrison (2003) argued that it is possible to use quantitative methods in the context of ethnography provided that they are consistent with the epistemological principles of the study. In this case two questionnaires were administered in the later stage of Phase 1 to explore how teachers perceived they integrated IWBs into their curriculum and how they adapted their pedagogy. Results of these surveys were quantified to reveal trends and patterns in the data. Further, these instruments allowed for both analysis at a whole-school and year level and allowed access to the multiple voices of the participants.

### **IWB Questionnaire**

I developed the IWB questionnaire (Appendix A) after conducting a review of the literature on IWBs. Its purpose was to gain insight into teachers’ perceptions about the IWB as a teaching tool, its impact upon learning and teaching, and the range and extent of curriculum areas in which it was used. The questionnaire was designed as a 28-item instrument which used a series of closed and open questions. Closed questions allowed for a yes or no response. A critical friend provided feedback during its construction and prior to implementation to optimise the clarity and minimize ambiguity

in these questions. The questionnaire was sent to all teaching staff for completion and return.

### **Procedure for Data Collection: Phase 1**

Instances of classroom practice were observed in both Term 1, 2005 and Term 4, 2005. In Term 1, observations were recorded as handwritten field records. The observation was followed by a semi-structured interview with the teacher who had been observed. In Term 4 the process was similar, but photographs of the classroom environment were collected prior to the observation. Observations were also video-taped.

### **Procedure for Data Collection: Phase 2**

Whilst Phase 1 was concerned with an exploratory investigation or reconnaissance of the school site, Phase 2 sought to gather data in a more intensive fashion in order to be “able to see patterns of behaviour over time” (Fetterman, 1998, p. 9) at the whole-school level, year level and teacher level. Ethical approval for this further investigation was granted by both Education Queensland and Griffith University (CLS/01/06HREC). The process of reconnaissance was continued throughout this phase as a means to ensure “an ongoing assessment of events, viewed in a context broader than the immediate focus of a research inquiry (Wolcott, 1999, p. 211).

By engaging in longer-term fieldwork it allowed me to “make finer distinctions between change *efforts* and changed *results*, or between *change* and the *rhetoric of change*” (Wolcott, 1999, p. 217, italics in the original). During this phase the scope of investigation at the teacher and year level was narrowed to one professional learning team or year level, and the teachers within it. This focus enabled me to delve into how meaning was constructed both collectively in the classroom, as well as subjectively by the participants and in relation to notions of change.

### ***Data Collection: Phase 2***

Similar data collection techniques were employed as in Phase 1. Table 3.2 shows the data collection periods, the quantity and type of data collection and the unit level data address. In order to gather information at a whole-school level, written field

notes or audio-taped data were collected from fortnightly staff meetings or school committee meetings. Existing artefacts such as school documents were also collected.

At a year level, planning documents were collected and field notes or audio tapes recorded planning meetings. Additional information in relation to the teachers and students was obtained by employing several instruments. To develop an understanding of what counted as Multiliteracies in each classroom data collection methods involved video-taped observations, field notes, planning documents and work samples This was supplemented by the collection of literacy artefacts, and the spatial and temporal distribution of the literacy related objects with description of contexts of usage. In addition, teacher reflections after observations were included to provide access to the subjective meanings of teachers. In the following section, I discuss the additional data collection techniques involving teacher reflections, researcher journals, work samples, and other instruments used for their relevance to this study.

**Table 3.2 Data Collection: Phase 2**

<b>Data Collection Periods</b>	<b>Data Collected</b>	<b>Unit Level Data Addresses</b>
<b>1. How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?</b>		
<b>2. How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?</b>		
25/01/ 06 to 28/11/ 2006	School Documents Administration Interview Field Notes of Staff Meetings Field Notes of Committee Meetings	Whole-school Level
	Planning Documents Planning Meetings Multiliteracies Assessment /Home Literacy Practices Survey	Year Level (Year 4 )
	Initial teacher interviews Video Observations Field Notes Work Samples Resources Multiliteracies Reflection Tool Teacher Reflections	Teacher Level (Year 4)

### **Teacher Reflections and Researcher Journals**

In addition to the data collection techniques of participant observation, interviewing, the collection of artefacts and survey instrumentation used in Phase 1, research journals and teacher reflections were used in Phase 2. Research journals were

kept during the entire research process and provided a heuristic tool for reflection (Fletcher, Zuber-Skeritt, Piggot-Irvine, & Bartlett, 2008). Further, it helped “to facilitate the construction or creation of new knowledge” (p. 61) in relation to methodological and theoretical decision making processes, collection of data, analysis and findings. It also helped to identify significant events in relation to the findings of the study.

From a radical constructivist viewpoint teacher reflections provided insider or “emic” knowledge. Teacher reflections comprised either reflections on a structured reflection sheet or informally sent reflections sent via email. Structured teacher reflections were based on a SWOT (Strength, Weaknesses, Opportunities, and Threats) matrix, with predetermined categories relating to texts used, teaching practice, and resources. Kemmis (2007, p. 173) highlighted the purpose of critical self-reflection is “to discover previously unrecognised distortions of interpretation and action.” They were an important aspect in considering an individual teacher’s decisions, feelings and motives and allowed exploration of teacher’s espoused beliefs and the congruence with theories-in-use or the enacted literacy practices evident in observations. Additional artefacts such as these and planning documents, teacher produced resources, classroom resources and work samples allowed for evidence of multiliterate practices to be explored.

### **Instrumentation**

LeCompte and Schensule (1999) proposed that surveys can be used for the confirmation of patterns defined from earlier ethnographic analysis. In Phase 2 three different instruments were used to achieve this process. In June 2006 a Multiliteracies Pedagogical tool (Butler, 2003) (see Appendix B) was given to teachers in the selected professional learning team to explore their espoused theories about aspects of Multiliteracies pedagogy (Cope & Kalantzis, 2000) and to relate this to aspects of enacted practice.

Interpretivist researchers apply a transcendent perspective in relation to the use and application of new knowledge (Neuman, 2000). This means “the researcher develops research together with the people being studied, examines inner lives, to gain an intimate familiarity with them, and works closely with people being studied to create mutual understandings” (p. 93). Teachers actively sought feedback about how their pedagogical practice may be improved. Tools which assessed their students’ current

multiliterate practices were developed and employed from this reflection. The first instrument was a Student Home Literacy Survey (see Appendix C). The purpose of this instrument was to gather information about students' home literacy practices with a view to informing pedagogy. Some more capable students answered the questions themselves, while others required my assistance in the transcription of their responses. I developed a Multiliteracies Assessment Tool (see Appendix D) which was administered to students in a whole class situation to provide information about their current literacy practices. This related to the practices of the Four Resources Model (Freebody & Luke, 1990): text decoder, text participant, text user, and text analyst as outlined in the Chapter 2. This tool provided teachers with information to allow for future planning in relation to Multiliteracies pedagogy.

### **Procedure for Data Collection: Phase 2**

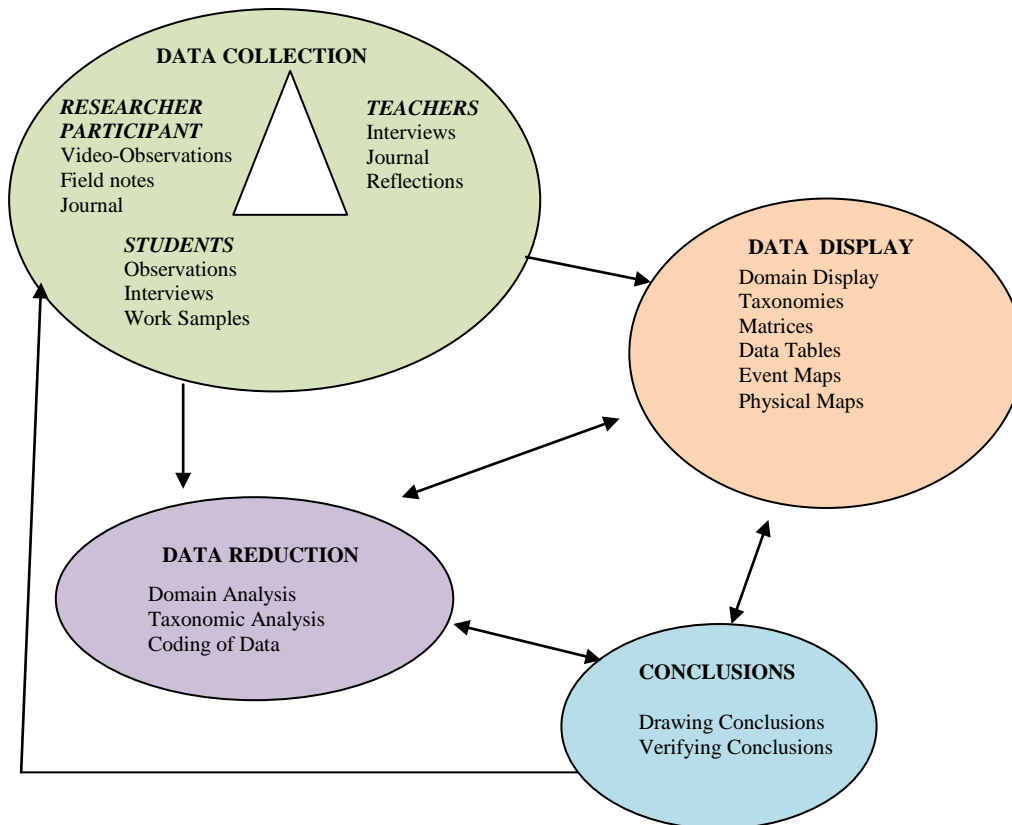
Classroom practice was observed for the duration of 2006. Some initial observations were recorded as handwritten field records; however, once trust was established, observations were video-taped. These formed the basis of subsequent informal discussions with both teachers and students. During these discussions I asked clarifying questions based on my interpretation of the observational data. Following these discussions, teachers wrote up reflections on a structured reflection sheet or sent reflections via email. This sequence of data collection from research observations to teacher reflections allowed for triangulation, thus creating a higher level of validity of video-taped observations. LeCompte and Schensule (1999) highlighted the necessity of triangulation of numerous sources of data in ensuring an accurate picture of specific cultural categories.

### **Data Analysis: Procedure**

Miles and Huberman (1994) countered that the strengths of qualitative analysis depends on the proficiency with which data analysis is conducted. They defined analysis as comprising three simultaneous activities: data reduction, data display and conclusion drawing/verification. Figure 3.3 shows these components as exemplified in this study applying both ethnographic and other means of qualitative analysis.

Data analysis was approached from an ethnographic perspective as the re-creation of the culture being studied, in this case the school and its classrooms, is central to an ethnographic approach. This method sought to make visible the explicit and tacit

cultural knowledge that shaped current whole-school practice using the IWB pertaining to multiliterate practices. Spradley (1980, p. 116) described ethnographic analysis as a “search for the parts of a culture, the relationship among the parts, and their relationship to the whole.”



**Figure 3.3. Components of Data Analysis (Source: Miles & Huberman, 1994)**

Data were analysed using both inductive and deductive approaches. The former sought to explore themes emerging in the data. Thematic analysis was used to construct meaning and refine meaning in relation to the guiding question of the study. All empirical data were open coded for concepts and cultural *domains*. Selective coding which is more focused sought to organise the earlier concepts or domains into *taxonomies*. At all times, when coding data, comparisons were made between emerging categories. Documented information yielded from this comparative process allowed for the establishment of connections between categories. An inductive approach was applied to artefacts, interview data, classroom observations, transcripts from these classroom observations, and teacher reflections. Ethnographic data analysis which is

guided by both from naturalistic concern seeks to illuminate participants' experiences and points of view. A constructionist analysis is concerned with the "procedures, resources and conditions through which reality is apprehended, understood, organised and conveyed" (Holstein & Gubrium, 2008, p. 376).

The notion of what classroom discourse analysis entails has evolved over time, in light of "the challenges of articulating what might be seen as an adequate account of language in the social construction of experience" (Christie, 2002, p. 2). In considering that teaching and learning with an IWB is mediated by an increased range of modes of communication, a multimodal semiotic approach (Jewitt, 2008; Jewitt & Kress, 2003) was deemed necessary. Jewitt (2008) claimed that it is the representation of knowledge, along with the mode and media selected that is crucial to knowledge construction. She highlighted "the ways in which something is represented shape both *what* is to be learned, that is, the curriculum content, and *how* it is to be learned" (Jewitt, 2008, p. 241, italics in original). This multimodality, for example gestures, movement, sound which were evident in the classroom event were acknowledged when transcribing and analysing classroom interactions, as well as any multimodality of any texts used within these interactions.

A deductive approach to data analysis, sought to explore relationships to theory identified in the literature review, in particular, Multiliteracies theory and pedagogy (Cope & Kalantzis, 2001), models of ICT integration and professional development (Sandholtz et al., 1997), the construction of interactive learning environments (O'Rourke, 2001), and aspects required for a whole-school implementation of IWBs (Kent, 2003, 2008). These theories formed measurement categories for a Crosby Grid (see Chapter 2). A Crosby grid was developed and used as a framework to identify stages of development and growth of the school and teachers in relation to each of these categories in Phase 1 and Phase 2. This Crosby grid became the IWB Implementation Grid (Kitson, 2009) referred to in Chapters 4, 5 and 6.

### ***Coding Process***

Data from Phase 1 drew from teacher interviews and questionnaire data. To identify data sources in the results chapters, individual teachers are coded by the year level, for example Yr1a, Yr 4, Yr 7, Yr 1b, Yr 5, and Yr 7. Questionnaire data drew



from 20 teachers who will be coded as T1, Q: Line 1. One respondent was a member of the school administration and is referred to as DP1, Q: Line 21. In Phase 2 data drew from teacher interviews, teacher reflections, classroom observations of four teachers in a Professional Learning Team, and an interview with the school Principal. Data sources are coded PLT 1, PLT 2, PLT 3, PLT 4, along with the type of data source (e.g., observation) and the relevant appendices location. Janelle, the case-study teacher can be identified as PLT 1 in the data. The Principal has been referred to as SP.

### ***Validity and Reliability***

Merriam (1988) suggested that validity and reliability are issues that can be addressed through careful planning in the conceptualisation phases of the research project and attention to the way in which data will be collected, analysed and interpreted. Quality criteria for assessing the internal and external validity, reliability and objectivity of interpretations have translated for constructivists into notions of trustworthiness and authenticity (Denzin & Lincoln, 1994, 1998). Guba and Lincoln's (1981) notion of trustworthiness looked at the principles of credibility, transferability, dependability, and confirmability. These will be addressed within this study.

Brewer (2000) suggested that the validity of an ethnographic approach can be improved by analysis that "is devoted to developing the variables that capture social meanings rather than necessarily 'telling it as it is'" (p. 107). This was achieved by using codes, diagrams, matrices and other categories which sought "to numerate data by constructing objective indicators of insider's understandings and expressing them in a formal language" (p.107).

### **Establishing Credibility**

Guba and Lincoln (1985) suggested techniques that foster more credible findings and interpretations. These are prolonged engagement, persistent observation, triangulation and referential adequacy. Each of these has been addressed deliberately during the process of data collection and analysis. Prolonged engagement and persistent observations of the participants were achieved through the collection of data over a period of two years. Triangulation was achieved through multiple sources of data collection such as video-taped observations, informal discussions with teachers and

students and teacher reflections. This allowed for the cross-checking of interpretations with the participant.

As the researcher I am the primary instrument in this study and all observations and analyses are filtered through “one’s worldview, one’s values, one’s perspective” (Merriam, 1988). The need to be aware of researcher bias was a key (Merriam). Further it also needed to be remembered that the philosophy underpinning an interpretive approach recognised there are multiple realities, not just mine. The triangulation of data sources and member checking was one strategy used to reduce systematic bias in the data. Furthermore, careful attention was given to ensuring the accurate recording of observational notes and memos. These noted any reactive effects of the participants to my intrusion. Some authors (Brewer, 2000; Pole & Morrison, 2003) have referred to this important aspect as “reflexivity,” in which ethnographers need to “turn inwards” (Brewer, 2000, p. 108). Noting reflections on written field notes and the keeping researcher journals allowed me to be reflexive in relation to all aspects of the research process.

### **Establishing Transferability**

Murray-Thomas (1998) pointed out that a major limitation of any principles or generalisations of case-study design is its lack of applicability to other situations, due to the unique and context-bound nature of this approach. Stake (1995) stated that primarily we do not study a case in order to understand others but rather our obligation is to first understand the particularity of the case. He argued for “naturalistic” generalisations, which through the use of rich, thick description and clearly presented interpretations, readers can construct their own generalisations. An ethnographic approach sought to allow for understanding of the situation and participant actions. Hence the validity of any assertions made from this study has provided evidence for propositions that may be generative for further thought and action in similar professional development contexts (Dick & Swepson, 1994).

### **Establishing Dependability and Confirmability**

A key priority of any qualitative research in establishing dependability and confirmability is the necessity to document all aspects of the study. A detailed description of participant selection, the site, and procedures, has been provided to establish a chain of evidence that links this whole study. Field notes and transcriptions

of field notes from observations will be included to allow for independent analysis. Procedures for data collection were monitored and reviewed by critical friends throughout the process.

### **Summary**

This chapter has provided a theoretical rationale for the conceptual framework and research design and implementation of this study. An explication and justification for framing this study within two interpretive theoretical paradigms of social constructionism and radical constructivism were provided. It also defined the units of study of this embedded ethnographic, case-study design and how this addressed the questions under investigation. As language, literacy and texts are socially constructed, it was important to identify methodologies that allowed access to the participants' perspective. The choice of ethnographic methods provided insights and illuminated meanings in relation to multiliterate practices. The strength of this approach is that it offers a valid way of exploring the subjective processes of participants. It allowed the capture of data that provides depth and detail by "getting close" physically and psychologically to the phenomenon under study (Patton, 1990). Analysis of Phase 1 data is provided in Chapter 4. Chapter 5 provides analysis of Phase 2 data.

## CHAPTER 4

### RESULTS: PHASE 1

In Chapter 3, I established theoretical underpinnings of the research design for this study as an ethnographic approach, shaped by social constructionism and radical constructivism (Glaserfeld, 1995). This approach informed the process of data collection and analysis undertaken over two phases. Results for the first of these phases are reported here and address the following research questions:

1. *How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?*
2. *How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?*

Results in Phase 1 map the journey taken by teachers and administrators as a series of stages. First, I provide ethno-historical research which details how the IWB came into being in the school studied in this research. Second, I document how three *early adopters* (Levy, 2002) worked with IWBs and how this experience influenced their beliefs and teaching practices. Third, I report how the whole-school implementation of IWBs influenced other teachers' beliefs and practices. To summarise the different stages of the journey, an IWB Implementation Grid (adapted from Crosby, 1980) is used to plot the findings as a summary of the different stages of the journey. Finally, I report on teachers' espoused and enacted practices and how they socially constructed what counted as Multiliteracies.

#### **Introduction of IWB: A Beginning**

Interactive whiteboards were originally designed for the corporate market as a presentation tool. However, by 2002, the Principal of the school where I conducted my research had recognised the potential of the IWB as a tool for the additional purpose of

presenting and sharing information. Attempting to capitalise this potential, he had installed one in the school's curriculum planning room. It had been used incidentally, for 12 months. During this time, the potential of IWBs in educational settings was being explored elsewhere – such as in a small number of schools in the Australian Capital Territory (ACT). A Year 1 teacher from the research site had visited one of these ACT schools and observed the use teachers had made of IWBs in classrooms. As a result, she persuaded her own school Principal to relocate the school's IWB from the curriculum planning room to her Year 1 classroom. He did so.

This action initiated the school's journey into potentially promising but empirically unproven territory. As the journey evolved, administrators made a series of three informed decisions to progress and support the process. The first decision was to expand Internet cabling to the Year 1 teaching area with a view to providing a technologically-enhanced, learning environment. A second decision was to install additional IWBs at other year levels. The third decision was to form an Interactive Learning Environment Committee (ILE) to facilitate the IWB implementation and to deal with any issues that arose. These decisions affected the social realities of the school as a technological educational site and are described below.

### ***Early Adopters Finding their Way***

School administrators were conscious of how *early adopters* would respond to the opportunity, so were cautious in determining who would receive IWBs in the first instance. The selection process used to assign the IWBs required interested teachers to write submissions to justify installation of an IWB in their classroom. All submissions were considered by the Principal who selected three teachers, one in Years 1, 4, and 7, respectively. These teachers provided reflective data to me as researcher in interviews and as an observer in their classes throughout the phase. The data were analysed to interpret whether and how the teachers' integration of IWBs had influenced their beliefs and teaching practices.

## **How are Teachers' Beliefs and Practices Shaped by the Implementation of Interactive Whiteboards?**

### ***Confidence with Technology***

Two related aspects of early adopters' confidence were noted. First, they were enthusiastic about using IWBs and exhibited confidence in this technology. All three teachers attributed their confidence to prior experience with technology in other contexts, and they believed that collaboration with staff within the school had helped them gain their confidence. However, whilst confident in their ability to work with and use IWBs, using IWBs to promote learning presented pedagogical issues for them. For example, they were less confident of whether they had used it well as a teaching tool and in sharing their concerns with me as researcher; they discussed how they had begun to address this issue.

Teachers' descriptions of their level of confidence in using technology were constructed around prior experience and collaborative support. The Year 1 teacher attributed her confidence with the IWB to training in her university degree, saying that, "I think it's probably going to Uni when we did. We learnt a lot of programs at Uni" (Yr 1: Line 8). Both Years 1 and 7 teachers, who were recent graduates, felt from her university training that there could have been greater emphasis on using technology in the classroom than had been happening in the school. The former believed it was important to transfer skills developed in software programs commenting that, "Just all that exposure constantly where you learn all the different skills and different programs and then you can just transfer when you need to do things in the classroom" (Yr 1: Line 12). However, the latter believed that specific ICT courses taken in her initial formal preparation had not shown her how to use software for teaching purposes.

The Year 4 teacher was in her eighth year of teaching. Whilst having no formal qualifications in relation to ICTs, she had worked as a secretary using a computer for word processing. She had completed numerous in-service training in relation to ICTs and attributed her confidence with use of software to risktaking and adaption. She stated that, "If there is something I can't do, I don't mind taking the risk learning how to do something. I think because I have an extensive background using so many programs that I find it easy to adapt to other ones" (Yr 4: Line 4). However, she was not as confident with the operation of computer software. The Year 1 teacher believed that for

software packages she had not used, it was “ a matter of listening to how other people use it and getting in and playing with it and see if you can work things out” (Yr1: Line 10).

An aspect identified by each of these early adopters for developing their learning with IWBs was collaborative networking with peers. The Year 4 teacher believed that the whole journey started with her colleague, the Year 1 teacher’s sharing of what she had experienced when witnessing IWB in use at the ACT school. She reflected, “She knew somebody who had used them so she got the first lot of inside information. It was her motivation and her interest in it that got everyone else going to be honest” (Yr 4: Line 58). The Year 7 teacher believed the school Principal was also involved in this influence through his advocacy and support. She commented that, “So they (the Year 1 teacher and the Principal) both did it really and encouraged all of us teachers to get into it” (Yr 7: Line 4). For the Year 7 teacher, having a colleague who had previously experienced the IWB in a Year 1 classroom was pivotal to her learning. She explained, “So she has taught me. So, it is a lot of teacher-peer tutoring” (Yr 7: Line 14). These data illustrate a view held commonly by the three early adopters. They had produced their knowledge of IWBs and IWBs as pedagogical tools collaboratively, and constructed and reconstructed it as learners and teachers as they included it progressively into their practice.

*Early adopters* reported that they had not received formal training on the IWB, but that learning developed through having time to experiment. The Year 1 teacher commented that, “It was just sort of given to us and we were told to play with it” (Yr 1: Line 14). The Year 7 teacher stated, “but it was a lot of my own time” (Yr 7: Line 14). The illustrations in this paragraph underpin how the three early adopters’ learning on the job may have helped them to become comfortable with IWBs as technology but not necessarily to become confident with it as pedagogical technology.

All three *early adopters* indicated that they had, in varying degrees, implemented technology in the classroom prior to installation of the IWBs, but described it as a difficult process due to computer problems or lack of computers. The IWB had changed this situation. They noted a few difficulties with technical, software or networking problems when using IWBs. School administrators, as part of the implementation process, had considered issues such as storage of files with a system for storage on the servers. Teachers used memory sticks to enable transfer of resources

created at home. These early experiences with IWBs as a potential teaching resource suggested that the IWB technology was user friendly, intuitive, and furthered their confidence as technology users. This was supported by the Year 4 teacher who commented that “I guess you have got to be somewhat orientated towards computers but it’s fairly user friendly” (Yr 4: Line 58).

### ***Initial Effects of IWBs on Teachers’ Practice: Old Wine in New Bottles***

Confidence emerged as an essential reality which equipped early adopters to take up IWBs. They reported using IWBs in different ways, for different lengths of times and in different content areas. The IWB offered a new way to approach their existing way of teaching and had influenced their teaching practice. Primarily, the IWB was used as a presentation tool to replicate activities usually conducted using a blackboard or worksheet. Use of the IWB in these early days involved new ways of presenting existing activities.

The IWB was used as a tool to organise learning experiences with teachers indicating that IWBs were used as a stimulus to introduce lesson content during the orientating phase of the lesson, to review prior lessons or concepts, for small group activities, for extension activities, and to provide reflection and closure. It was used for different lengths of time and in different content areas. For example, in Year 1 it was used for English and Mathematics sessions, which focused on foundational literacy and numeracy skills. The Year 1 teacher commented “Certainly you can definitely use it for English and Maths mostly. That’s mostly what we use it for” (Yr 1: Line 26). She elaborated that:

Most days we probably use it in two. Generally we always use it in the morning, we use Letterland on it and the weather chart. We pretty much do that every day. Middle session we try to do some maths on it where we might do a bit of a game or a modeled session before we separate. It depends on the concepts and what is available there and what we have made up in lessons (Yr 1: Line 24).

Similarly, the Year 7 teacher indicated use for Mathematics and English, but believed the IWB could be used for other areas, dependent on available resources.

I mean we find it really easy to use for maths and English, like it’s quite easy to use. Art we haven’t tried that yet but I can see, like Science for example, we



are still trying to find the sites that we can use up on there and then develop it that way. But Maths and English are the strengths at the moment for us, but that could be just because we haven't had that training yet (Yr 7: Line 36).

The Year 4 teacher, however, nominated its use in all content areas after some consideration. "I do. Um. It's hard. No, probably everywhere they can be. It is just finding the resources I think" Yr 4: Line 30). In both Years 4 and 7, teachers reported using the IWB throughout the day for part of all teaching sessions The Year 4 teacher commented "I would say at least every session, at least for some segment" (Yr 4: Line 28). The Year 7 teacher elaborated more:

Um. We use it every single session. Every single session a day but it could be for a different time period. Like in the morning... For maths we use it the most at the moment. Um and because it is good just to get the visual because we don't get a lot of resources at this school. So it is good to have the visuals. Um, we use it most for Maths at the moment but we use it every session for little things (Yr 7: Line 34).

Teachers reported a difference in the use of the IWB for the teaching of ICT skills. Teachers in Years One and Seven taught ICT skills separately. The Year 4 teacher modelled and demonstrated ICT skills within content areas. Her teaching of ICT skills was integrated. She commented that, "I tend to find that I don't go in with a lesson that specifically aims to introduce the ICT side of it, but we use our other subject areas through ICT ... So it all happens with the lesson, not separately" (Yr 4: Line 18).

*Early adopters* believed their teaching practice had been influenced by the introduction of the IWB. The Year 1 teacher indicated that her practice had adapted to the new technology. She remarked that, "a lot of what you would do before can be adapted to a whiteboard (Smartboard), so what you might have done with paper, you can do on the whiteboard (Smartboard)" (Yr 1: Line 30). The IWB afforded "new ways of doing old things" (Yr 1: Line 36). The Year 4 teacher acknowledged use of the IWB as a presentation tool. "We use it almost instead of a blackboard" (Yr 4: Line 14). However she and the Year 7 teacher believed their teaching practice with the IWB was something which would evolve and change. "I think it has [changed] and is still happening" (Yr 4: Line 34). Both Year 4 and 7 teachers perceived changes in how they presented lesson content, with the IWB now offering a variety of multimodal teaching resources. The following is illustrative, "Topics that aren't so interesting have been made a little interesting" (Yr 4: Line 34). The potential of using the IWB was expressed

in the Year 1 teacher's comment that, "you can do a lot more with it once it's (the lesson content) up there" (Yr 1: Line 30). Whilst teachers identified the potential of the IWB, this potential seemingly was not totally understood.

The IWB was used as a presentation tool that allowed for more interesting ways to represent content and offered new affordances for student learning. For example, teacher-created resources used on the IWB replicated activities that could have involved a blackboard, chart, or worksheet as I observed where the Year 1 teacher created a PowerPoint using the week's sight words. The teacher operated the resource so that she and the students read the words twice to establish a relative familiarity – and then this was strengthened as students selected and placed each word within the context of a sentence. Similarly, the Year 7 teacher created a resource for a grammar lesson on present participles using IWB technology that drew on her experience of formats with more conventional delivery mechanisms such as blackboard or on a student worksheet. A definition of a present participle was provided on the IWB, along with one example. Three students then wrote on the IWB their own examples of helping verbs and present participles. This was followed by activities prepared and presented on the IWB where students identified helping verbs by circling them, sorted a given list of verbs into types of participles, and discriminated correct from incorrect examples.

### ***Affordances of the IWB for Learning***

As shown below, *early adopters* in the interviews showed strong beliefs that the IWB afforded opportunities for student learning through the use of multimodal resources, particularly visual modes of learning; the ability to manipulate content, and the transfer and retention of ICT skills. As an outcome of these affordances, teachers perceived there was potential for the creation of more engaging lessons and student interactivity not provided by using traditional blackboards or charts.

The visual nature of IWBs afforded students an additional mode for learning, catering to students with different learning styles. In particular, the Year 4 teacher offered:

In terms of visual learning, we have a lot of kids that are SLI, speech language impairment and other learning difficulties and they seem to respond better to the visual learning than other types of learning that were traditionally done. (Yr 4: Line 44)

The IWB also presented students with opportunities to manipulate content, an important flexibility for students as teachers in Year 1 and Year 7 mentioned, the former in relation to the tactile way it gave students to practice handwriting by tracing over letters and the latter concerning encouragement of students' risk-taking in learning where they were able to alter and improve drafts. The Year 7 teacher observed that, "It's not on paper, where it feels like it is stuck" (Yr 7: Line 44). This teacher believed that if all students could visualise what she was talking about, that this would result in less chance of misconception in relation to lesson content. The capacity to move text objects and images around the IWB screen she saw as providing more interactive, hands-on work together, enhancing the appeal of visual images in specific lesson contexts and her teaching generally (Yr 7: Line 6).

*Early adopters* perceived that students retained and transferred ICT skills as a result of using IWBs. For example, the Year 1 teacher commented:

Watching us do it all the time and everyday opening programs, closing programs. Doing that sort of thing every day in the classroom, they pick it up so much better and so much faster. Even I was surprised with PowerPoint. When we had done things with PowerPoint then we went over there and you could see them doing it without having to explicitly teach them in the lab. They knew what we had done and they were trying it out over there. (Yr 1: Line 20)

The Year 4 teacher referred to the ability of students to take control and practise their ICT skills in lessons.

And I can even start the lesson and I will ask a child to be the teacher instead of me while I am sitting back and they are working out how to get to the next page. And they always retain it. I haven't found one child that hasn't so far. (Yr 4: Line 22)

Classroom observation showed that this practice of ICT skills related to technical operation of the board, with students moving to the next slide in the Smartboard Notebook presentation, or to open a file.

The Year 7 teacher commented how she made connections to previous lessons so that students would know how to set out tasks.

It is a good retention, especially because it's the computer, you know. If you show them how to set something out then it's their turn to set it out when you go to technology a few days later. They do remember how to do it and a lot of the time if they don't, to help them recall it they then remember it more... So

we can say remember what we did in the classroom when we thought up that word document and they do remember that, so it helps them to refer to it. (Yr 7: Lines 28- 30)

The IWB allowed all teachers to create lessons which they perceived as more engaging and motivating for students. The Year 1, teacher commented that “they can be a lot more on task than if you were just doing it on a normal whiteboard or piece of paper” (Yr 1: Line 40). The Year 4 teacher indicated the majority of her students were motivated through use of the IWB, but indicated there were a few students who didn’t like using the IWB. Her reasoning for this lack of engagement related to waiting to “have a turn” on the IWB.

Most *early adopters* believed that interactivity with the IWB related to the opportunity to have a turn or to physically or technically manipulate screen content. This was mentioned specifically by teachers in Years 1 and 7 in interviews, e.g. “Because you really only have one child who can actually manipulate the board at any one time ... because you have only got one child interacting” (Yr1: Line 32).

The Year 4 teacher explored the notion of interactivity as a concept related to attention and engagement with the content being studied. She explained that, “It is interactive even if they are not all getting up there. They have to be ready and prepared” (Yr 4: Line 44). The Year 4 teacher did at times, however, struggle to realise interactivity in some content areas: “Like in maths at the moment we are teaching mental strategies and I am finding it really hard to find a good interactive way to use the Smartboard with that. Like I can put the words up there on what we are going to do in the lesson but that’s not the interaction, it is the interactive side” (Yr 4: Line 30).

Observation of the Year 4 teacher’s practice confirmed her efforts helped her students to develop conceptual understanding through intellectual engagement with lesson content and the use of discussion. For example, in a mathematical problem-solving activity students were provided with four numbers: 15, 25, 35, and 45, and were required to use the addition concept for multiples of fives. The teacher posed a variety of questions to encourage their strategies. For example, she asked, “What strategies do you use in your head? Should any of your scores end in five? What are the different ways you can score 50? What is the greatest score you can make?” (Yr 4: Field Notes). Opportunity for students’ interactivity was based on how they responded to these questions. However, there was little extended response to any of the teacher’s questions.

Whilst she tried to engage students with the concept of addition, there was little physical or technical interactivity with the IWB; she used it only for presentation.

Teachers' perceptions of interactivity appeared to shape their beliefs about students' roles in the learning process. The Year 1 teacher believed that students' roles were changing, but that the pace of change was limited by turn-taking using the IWB. "Because you really only have one child who can actually manipulate the board at any one time...because you have only got one child interacting" (Yr 1: Line 32). She discussed how her students required hands-on activities to "practise and explore the concept you have been using the board to maybe introduce" (Yr 1: Line 32). Teachers in Years 4 and 7 believed the creation of more interactive, visually-interesting and engaging lessons had a positive outcome where their students were responding now as active learners rather than passive ones. The Year 7 teacher reported that with IWB available in lessons, there had been less reliance on teacher talk and questioning. Her students were now acting as "little teachers" (Yr 7: Line 42) through using, interacting with the IWB, and then talking about their actions to the class as a whole.

### ***Speedbumps Along the Way ... Constraints***

Whilst *early adopters'* interviews and my observations of their practice indicated that the IWB was being absorbed as a significant part of their teaching repertoire, there were still certain constraints on how it was being used. The three teachers had identified issues of their implementation which they believed had negatively affected student learning. These related to the practicalities of sharing an IWB, placement of the IWB, student behaviour, and their access to IWBs.

In this early implementation, teachers felt constrained by the practicalities of sharing an IWB between two classes in a double teaching space. In Year 1 about 40 students worked with the IWB, whereas in Years 4 and 7 there were 60 students. Teachers reported that if each class of 20 to 30 students used the IWB separately, students in other classes sharing the space often were distracted. In Year 7, students were required to go back to their desks to copy work or finish tasks once instruction was concluded. However, the teacher commented that "they can't all see the Smartboard, so that's an issue (Yr 7: Line 46).

Behaviour management when using the IWB was a concern for the Year 4 teacher, in particular in her work with students with special needs.

Management of the children, not having kids who can work independently and um we have got a lot of Special Ed kids who damage equipment, so I find that quite hard to manage. (Yr 4: Line 12)

All teachers believed that access to the board was an issue, with only one child at a time able to physically or technically manipulate it. The Year 7 teacher indicated it was challenging to ensure equal access for students who required additional learning support in whole class time, while still trying to maintain the focus of the rest of the class who may be more academically advanced. The Year 1 teacher perceived that students were limited by lack of opportunity to manipulate content on the IWB, with tactile exploration of content required for learning. Teachers' perceptions influenced the choices they made about how to apply the IWB for teaching and learning opportunities.

### **Summary**

Several critical events were identified as significant in shaping the process of IWB implementation. These are listed in Table 4.1. First, the school Principal purchased an IWB for planning purposes. Then, a teacher commenced the journey of the whole-school's consideration of IWB use throughout the grades. Her first steps were a vision for the purchase and use of a commercial product in an educational setting, in particular, her Year 1 classroom. However, she needed more than an intuition that an IWB would be a good move for her class and school. Confirmation came from her observations and the assurances of other teachers and administrators when she visited another school where use of IWBs was both widespread and established. Third, the school Principal and other administrators played a significant role in committing money and resources to establishing IWBs, providing internet cabling, purchasing IWBs, supporting the development and stockpiling of teacher-designed resources and creating a management infrastructure, the school's Interactive Learning Environment Committee. These actions shaped what constituted an IWB reality in this school and set in place resources and conditions through which teachers would organise and conduct their teaching with the IWB technology.

**Table 4.1 Critical Event Chart Initial Implementation of IWBs**

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Date	Event
2002	Principal purchases 1 IWB for curriculum planning room
2003	Teacher views IWB being used in ACT school
2003	Teacher persuades Principal to move IWB to Year 1 classroom
2004	Expansion of Internet cabling to Year 1 classrooms
Sept 2004	IWBs to Years 1, 4, and 7 classrooms
Sept 2004	Establishment of ILE Committee

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Findings from this early adoption of IWBs in relation to key aspects central to the implementation of IWBs in this primary school setting have been summarised using an IWB Implement Grid in Table 4.2 (adapted from Crosby, 1980). These aspects were compared to pertinent findings in relation to the theoretical literature and are reflected in the Y axis of this grid. Critical events discussed above constituted the role of leadership and management. Other areas central to this process were: professional development, teacher integration of IWBs, and the construction of interactive learning environments. The X axis documented school and teacher development in relation to the early implementation phase.

A considered selection of teachers or *early adopters* who would lead the way with implementing IWB technology was a critical part of the whole-of-school phase-in. Whilst no professional development was provided to progress teacher development, early adopters had moved to the awakening stage of integration through experimentation with the functional aspects of IWB software and networking with other early adopters.

**Table 4.2 IWB Implementation Grid (Kitson, 2009) Early Adoption Phase**

Measurement Categories	Stage 1: Uncertainty/Not evident	Stage 2: Awakening
<b>Leadership and Management</b> Based on Kent (2003, 2008)	A few IWBs are featured in the school, however, there is lack of interest and support from school leadership to integrate ICTs into classrooms	Further IWBs are purchased, which are fixed within key classrooms. There is some sharing amongst teachers from these key classrooms.  School leadership – starts to manage best ways to store teacher developed resources and tackle technical issues
<b>Professional Development</b> Based on Sandholtz et al. (1997)	Little in the way of professional development is offered to teachers as they try to implement IWBs into their classrooms.	Training in operating IWB technology and basic software packages – Smart Notebook, PowerPoint, Word. Need for sharing and collaboration with peers. Teachers experiment with software
<b>Integration of IWBs into the curriculum</b> Based on Sandholtz et al. (1997)	Entry stage. Teachers are reluctant to try new things, reverting to traditional teaching methods. Teachers may experience problems with technical issues or the resources which inhibit use.	Adoption stage. A greater effort to integrate technology into daily lessons, but activity choice is limited to replicating existing teaching practice. Teachers experiment with functional aspects of software to create lessons. IWB is used as a presentation tool.
<b>Construction of Interactive Learning Environments</b> Based on O'Rourke (2001)	Learning environment created with IWB replicates existing instructional discourse. Interaction is teacher centred.	Engagement with IWBs is at the technical and practical levels of use. Motivation and interaction is defined in terms of physical manipulation of IWB and turn-taking.

They integrated IWBs on a daily basis, replicating existing teaching practice. At this stage of the journey, most of the *early adopter* teachers defined engagement and interactivity in terms of turn-taking and physical and technical interaction with the IWB. They were aware of the potential but were struggling to find ways to utilise the teaching opportunities that they believed the IWB afforded. At this stage, after six months of use, *early adopter* teachers were confident and used IWBs daily as they explored resources and adapted teaching activities to an IWB learning environment.

### ***Where To From Here?***

All *early adopters* were reflective in their beliefs about what was required to move forward in their journey of ICT integration. They believed there needed to be sharing outside the school environment, renewal of curriculum, purposeful use of the



IWB, adaption of Smartboard software for their use, and participation in a range of professional development opportunities.

The Year 7 teacher expressed the need to move outside her Professional Learning teams to see what other schools were doing in trialling the IWB, and in particular, to review practices in international schools where the IWB had been implemented effectively.

We are all ready to move on now and to find out more, new ideas. Just get them from out of the school. Because when you get them from inside the school you are just getting them from your year level and there are only three other classes you can compare against. So we need to compare against other schools and other classes. (Yr 7: Line 66)

The Year 4 teacher was concerned that with teachers using the same activities and resources each year there was a need for curriculum renewal through more creative lessons and the use of additional software programs for task completion. She pointed out that, “as the kids go through year by year it’s the same thing each year and I think teachers are going to have to try and stay that one step ahead” (Yr 4: Line 56). The Year 1 teacher issued a caution in relation to IWB usage generally, “You’ve got to be aware of how you are using it and what purpose the children are getting from it” (Yr 1:Line 32).

Furthermore, the Year 1 teacher was conscious of the need to ensure the Smart Notebook software catered to teaching purposes and the needs of her students. For example, the picture gallery clip art was structured under categories for which there was no search facility. This made it time consuming for teachers to locate what they needed. Teachers also wanted more specific Australian content included in the gallery as clip art, and had started conversations with software producers to include some of these items in software upgrades.

The Year 1 teacher nominated that professional development should be differentiated for teachers with varying lengths of IWB usage. Teachers new to the IWB “need basics and how to use the basics” (Yr 1: Line 56), whereas, teachers from the initial implementation who had already been trialling the IWB for six to nine months needed more advanced skills. In addition, she nominated the need for professional development linked to content areas, “where someone who has expertise in that

particular field can come in and say you could use it really well this way, really well that way” (Yr 1: Line 56).

Whilst *early adopters* were thoughtful and insightful in their beliefs, their teaching practice typically was replicating activities they had used in the past on a blackboard or worksheet and in ways they had done this. Further, what they attempted was tied to their ability to use the functions of the software, or of the IWB itself. One of the teachers noted:

Apparently we are using it in the best way...The functions of it are quite simple, so I think all the teachers at this school now know how to use the functions. So it is just now lesson design, different lesson plans and examples. (Yr 7: Line 64)

Teaching with IWBs was driven by the technology so whilst teachers were using IWBs and a range of resources in their classroom, they had yet to consider how the IWB impacted upon their teaching practice and then reflectively to consider this and alternative approaches.

### **We Are All in This Together ... Whole-school Implementation**

The plan for a whole-school implementation of IWBs was realised in April, 2005. The Principal and Deputies as the school’s administrators were mindful of a need to evaluate IWBs and the learning environments created by them. My research was part of this vision, which in turn would guide ICT priorities, professional development, future teaching, and planning. My research would also play a role in construction and reconstruction of teacher knowledge in relation to Multiliteracies. This was a significant change from technology-driven practice to considerations of effective pedagogical uses of IWBs.

Emphasis on teacher practice and beliefs was evident in artifacts, being Professional Learning Team Reports from June, 2005. These reports were the result of a staff meeting in which all teachers gathered in their year levels or professional learning teams. The purpose was to identify current usage of IWBs, envision future possibilities for IWB use, and identify additional support or resources needed. In spite of some teachers having IWBs for a period of only two months, teachers were able to identify possibilities in relation to teaching practice. They identified a need for: improved

integration of ICTs (Year 2), improved opportunity for interactivity, higher order thinking and engagement (Year 3, 4), and development of their current lessons (Years 1, 4), with opportunities for students to comprehend and compose multimodal texts (Years 2, 4, 6).

A questionnaire administered at the end of this first phase allowed for a snapshot of how classroom teachers used IWBs in the classroom. Questionnaire data were based on responses from 20 classroom teachers, with ten teaching across Preschool (P) -3, seven from Years 4-5, and two teaching across Years 6-7. One member of the Administration team completed the questionnaire. Classroom observations of three teachers, each representing Year 1, Year 5, and Year 7 allowed insight into situated teacher practice. In this section, findings are reported in relation to: confidence with technology, effects of IWBs on teacher practice, pedagogy of use, supports and constraints.

### ***Confidence with Technology***

Questionnaire data showed that sixteen out of twenty teachers indicated confidence in using an IWB. As with *early adopters*, teachers generally attributed their level of confidence to collaborative peer networking and experimentation and practice with the IWB. Two in Years 4-7 acknowledged that students were a source of knowledge for them as they operated IWBs. One teacher commented that it is, “Not difficult to master. Students of this age are fairly competent – learning together” (T7: Q: Q 8b). Teachers indicated confidence in a variety of software packages; the main ones were: Smartboard Notebook, Word and PowerPoint. This confidence was reflected in the use of IWBs in the classroom. For teachers who were not *early adopters* this was a beginning phase. However, having access to the early adopters willing to discuss their experiences, and other professional development, advanced their progress.

### ***Effects of IWBs on Teacher Practice: Old Wine in New Bottles***

Teachers were enthusiastic users of IWBs, integrating them into their teaching practice almost on a daily basis for a wider range of content areas, and incorporating a more varied range of resources than *early adopters*. However, once again, teachers believed their teaching practice had changed - whilst observations revealed use of

existing teaching approaches. In the following section, findings are reported in relation to: frequency of use, area of use, and pedagogical use of IWBs.

### ***Frequency of Use***

All teachers showed enthusiasm for using IWBs, indicating that they valued having a board in their classrooms. One classroom teacher with twenty years' experience commented that the IWB was the "most beneficial tool for teaching ...Once you see how it works you can't wait to use it with students" (T5: Q: Comments). This level of enthusiasm was evident across the school.

In Years P-3 and 4-5 teachers described typical use of IWBs as four days each week, whereas in Years 6-7, teachers described typical use as two or three days each week. Variation of usage time in these instances related to co-operative teaching issues or the need for hands-on activities. Two teachers indicated a need for balance between learning opportunities facilitated by the IWB and those without, stating "there is definitely a place for both – using the IWB and not using the IWB. The students appreciate this" (T 19: Q: Q 26). This was supported in a statement by the Year 5 teacher. She pointed out, "it is to me another tool and it is not the be all and end all. It's just a tool as much as I still use the OHP, I still use all that other stuff (Yr 5: Line 12). Teachers believed that the use of the IWB needed to be balanced in their teaching programs. They moved across a range of teaching areas, activities and lessons in their day and used a range of teaching resources.

### ***Area of Use***

With whole-school implementation, the extent of IWB usage was more varied than than it had been for *early adopters* alone. Teachers had started to see more possibilities for use, identifying nine content areas where the IWB was used. These areas were: English, Maths, Studies of Society and Environment, Science, Technology, Visual Arts, Health and Physical Education, Skills for Growing and ICTS. Five of twenty teachers nominated all content areas. Thirteen nominated three or more content areas. Two teachers identified the integration of numerous content areas for unit themes. Only three teachers nominated English and Mathematics, with two of these teachers representing the Years P-3. There was a general belief amongst P-3 teachers that there

were areas for which the IWB could not be used. These areas associated with the practical aspects of some content areas, such as Health and Physical Education where the gross motor skills of young children were prioritised.

In responding to the questionnaire, 15 of 20 teachers indicated use of the IWB for explicit teaching and modelling of ICT skills. Responses related to three areas that represented the types of skills and processes taught: dependence on task or lesson focus, functionality of operating computers or software, and consummation or production of a range of software. As with the Year 4 teacher in the early implementation, two teachers from the whole-school implementation indicated ICT skills were embedded in lesson content or task completion. Three teachers explicitly taught or modelled operational aspects of ICTs, such as, opening, closing or saving files. Six teachers reported using the IWB for the consumption (reading and viewing) or production (writing and designing), for example, conducting Internet searches, or creating a Photostory. Four teachers indicated they used the IWB for both consumption and production in their teaching.

Choice of activities described by teachers varied across year levels. Teachers in Years 1-3 focused on foundational literacy activities such as phonics, handwriting, recognition of sight words, and reading instruction. In mathematics, they focused on recognising number and number patterns. Similar activities in these content areas and associated skills were reported for Years 4-7. However, the range of activities described by teachers in Years 4-7 indicated a concentration on higherorder thinking skills including brainstorming, concept maps, searching and locating information, design, and reflection. Teachers' responses indicated a move beyond use of teacher-created resources to commercially-produced products such as Internet sites, interactive games, Learning Objects, and multimedia texts.

### ***Pedagogy of Use***

Teachers' use of IWBs was extended to daily class routines and for planning purposes. However, they were divided in their beliefs about the impact of the IWB on their teaching practice. Analysis of observation data revealed the use of IWBs as presentation tools where a wider variety of resources were accessed. Teachers suggested a shift in their relationships with students as a result of IWB implementation.

They saw themselves as facilitators of learning opportunities, learning with students in relation to technology.

As with the *early adopters*, teachers' use of IWBs was integrated as a feature of existing teaching approaches, with learning structured in whole class, small group and individual instruction. They nominated teaching strategies such as immersion in the topic under study, and focused teaching episodes that were characterised by demonstration and modelling of processes for concept development. These strategies describe the teachers' attempts to illustrate the ways they used IWBs in their classrooms. The extent of their use of IWBs was evident. It had become embedded within daily work for management strategies, for example, establishing class routines, behaviour management and transitional games between classroom activities. The IWB was seen as important in teacher planning, too. The Principal reported some teachers planning "their term into a multimedia presentation that was linked throughout the term" (SP: Line 48) and making this available to students on the school intranet.

Questionnaire data identified two different sets of perceptions about the influence teachers saw of IWBs on their teaching practice. Seven teachers perceived that it had not changed their teaching practice, whilst six indicated that it had. These changes associated with lesson content and use of instructional resources. One teacher indicated that she gave, "thought to lessons and how I can incorporate ICTs" (T 17: Q: Q23). Another said she enacted a "better model of a life-long learner, as well as being "more a facilitator of worthwhile learning experiences" (T 7: Q: Q23). A third teacher indicated a link to "incidental teaching due to locating appropriate resources that complement a lesson" (T 3: Q: Q18b). A fourth teacher felt that "maths introductions are a lot more successful now" (T 9: Q: Q18b). The ability to connect to the Internet was a point raised by some teachers with the Deputy Principal commenting that "there is more relevance and connectedness to the world outside the classroom" (DP 1: Q: Q 18b). She believed that, "It has enhanced the classroom pedagogy and has made the teachers more aware of the possibilities of multimedia and Multiliteracies in the classroom teaching" (DP 1: Q: Q 23).

However, observational data of literacy lessons in Year 1 and Year 7 confirmed that activities remained worksheet based or could have been completed using a blackboard. Teachers were not realising the potential of the IWB as an interactive teaching tool. In Year 1 teacher-created resources were used to write clues or sentences

about a sea animal. In Year 7, the classroom teacher initially used the IWB as a recording tool to list features of her career pathway. Once again, this was an activity which could have been conducted on a traditional blackboard. Later in the lesson, students accessed a webpage to record information in a flow chart about one person's life history. In Year 5, a commercially produced product or Learning Object (Learning Federation, 2004) was selected. Seven months after the whole-school implementation, teachers incorporated a wider range of resources but were still adopting approaches that could have utilised traditional resources. Whilst content was presented in new ways, teachers were finding it difficult to teach in ways that maximised the opportunities offered by IWB technology.

Changes in presentation allowed greater physical and technical interaction, and changing roles for teachers and students. Questionnaire data showed that fifteen of twenty teachers had described their role as facilitator and guide. Other descriptions provided by teachers included the notion of supporting and modelling, and greater student independence. Prior to the IWB, some teachers believed that "students tend to be more passive in their learning process" (T17: Q26), with students "usually doing more individual work" (T 6: Q26). The Deputy Principal suggested that, with the use of IWBs "Students mentor each other, students adopt a teaching role, students as experts" (DP 1: Q: Q 25). Teachers also considered themselves as learners or co-learners with students. One commented that at times she was "learning about new ICTs and ICT skills along with my class" (T 17: Q: Q 24). Some referred to themselves as designers or deliverers of lessons. The Deputy Principal's comment supported this, "Initially the teacher's role is planning teaching and learning experiences that ensure adequate coverage of the content and core learning outcomes of the QSA syllabi. The IWB is a tool for delivering these learning experiences" (DP 1: Q: Q 24: Appendix L). IWBs impacted on teacher and student roles as the approach to teaching and learning began to change. Teachers had started to talk differently about themselves, reconstructing reality through language.

### *Affordances of IWBs*

Teachers believed that the IWB provided multimodal affordances that would enhance students' learning through improved engagement. Whilst administrators

believed that learning activities should be intellectually engaging, observations revealed a focus on physical and technical interactivity.

Teachers believed that the multimodality of the IWB benefitted students' learning, and offered a choice of modes for students to represent their learning. One teacher emphasised that, "visual learners (which are most children) are receiving never before immediate access to images that support concepts" (T7: Q: Q 21) with the IWB being "able to be seen by all due to its large size" (T11: Q: Q 20). There was a consensus by teachers that most students were engaged when using the IWB.

Both Year 5 and Year 7 teachers described the importance of writing for different purposes and the role technology played in providing more visual means of completing tasks. The Year 7 teacher emphasised this purpose for learning with students "using the different technologies to extend themselves and their performance (Yr 7: Line 22). The Year 5 teacher perceived technology as providing students with "different ways of reflecting on their learning, on the purpose of learning" (Yr 5: Line 28). She believed that students needed to know "there is (sic) other ways to produce the same sort of text but in a different way, visually" (Yr 5: Line 30). In particular, the Year Five teacher referred to creating technology logs or visual diaries instead of more traditional journal entries.

Teachers believed that it was the multimodality of texts which allowed for this engagement and interaction. Their comments suggested interaction as physical or technical on a turn-taking basis which they described in varying terms as, "Hands on manipulatives" (T 7: Q: Q20), "participation and waiting for their turns" (T 13: Q: Q20), "actual tactile involvement in the content" (T 15: Q: Q20), "being able to touch the IWB and the writing pens" (T 18: Q: Q20).

It was the Deputy Principal who espoused conceptually-challenging activities. "Visually exciting, however, this has to be supported by thorough planning and preparation that delivers intellectually challenging teaching and learning experiences" (DP1: Q: Q20). However, observations showed that notions of interactivity centred mainly on physical and technical interactivity. There were few examples of conceptual interaction. In Year 1, students worked collaboratively to demonstrate their knowledge and comprehension of sea animals, by creating visual and written clues about a sea animal. Both physical and technical interactivity was observed as a small group of students negotiated turn-taking and experimented with selection of textboxes and font



sizes. In Year 7, interactivity was both physical and technical as students read biographies and recorded information about the person being studied. It was only in Year 5 that a Learning Object afforded conceptual interactivity along with physical and technical interactivity. Students had to engage with the Learning Object, and demonstrate their knowledge and understanding after analysing graph information to finally create their own product. In this activity physical and technical interaction was on a turn-taking basis, with the teacher directing student usage of the IWB.

Teachers reported a range of benefits in relation to the IWBs. IWBs developed experience using ICTs, provided opportunities for peer modelling and negotiation, and for global communication. One teacher noted a connection to students' recreational lives commenting that, "Learning is more interactive and is suited to what they are exposed to in their worlds – a technologically advanced society" (T 17: Q: Q 21). Teachers also considered themselves as learners or co-learners with students, saying "at times I am learning about the new ICTs and ICT skills along with my class" (T17: Q: Q 24). In Year 1, the classroom teacher had hoped that students would develop a diverse range of skills by engaging with the IWB such as computer skills through experimentation and peer-modelling, and negotiation and turn-taking. The Year 7 teacher described a focus on communicating globally through the Internet, and the use of research to learn more about content areas.

### ***Supports and Constraints***

Teachers believed that administrative support and provision of professional development were factors that enabled successful use of IWBs. However, they believed also that professional development needed to be ongoing. Whilst administrators attempted to tackle technical issues, these issues persisted and continued to be a significant constraint for a small group of teachers. Other constraints, identified from the questionnaire data, related to classroom logistics such as sharing between two classrooms, noise arising from the adjoining classroom causing distraction to students. In a classroom context, barriers to learning included issues of behaviour, student dispositions and lack of student knowledge.

All teachers felt that the school's administrators supported their implementation of IWBs in classrooms. Unlike *early adopters*, 19 of 20 teachers had

received professional development to guide them. Six of 20 teachers indicated the need for ongoing professional development to enhance their further practice. This view was supported by the administrators, with the Deputy Principal stating that “ongoing support and professional development as well as easy access to the IWB is essential in developing user confidence and expertise” (DP1: Q: Q 8b). When asked to elaborate on the types of professional development required, the Deputy Principal cited “actual use of the software and hardware. Ongoing PD related to multimedia and Multiliteracies” (DP1: Q: Q 27).

Constraints that teachers listed in relation to IWBs effects on their practice centred on: practical and logistical issues, technical issues, the knowledge and skills of students, and the behaviour of students. As with *early adopters*, the larger group of teachers commented on sharing of IWBs in double teaching spaces as problematic. One teacher commented, “(I) dislike teaching 40 plus kids in front of it. The children don’t get enough turns” (T10: Q: Q1). Several teachers related issues of their own accessibility. For example, one said “one to share between 2 classes is hard, doesn’t get the use I would like to get” (T12: Q: Q1). As with *early adopters*, the location of the IWB sometimes inhibited teachers’ use. One teacher stated that, “(I) dislike sometimes where it is situated as it disturbs the class beside me” (T8: Q: Q1). The time-consuming nature of preparing and locating resources for the IWB also was identified as a problem. Interview data from the Year 5 teacher showed that she liked the large, visual nature of the IWB, however, she had been disappointed that the content could not be printed. She felt that students needed wall charts and other environmental print to refer to when completing classroom tasks. Whilst school administrators were proactive in solving technical issues, some teachers referred to problems with power and downtime on the server. One commented that at times there was, “No power to classroom or other rooms with power interrupting” (T3: Q: Q12). However, teachers’ responses indicate that this situation was a localised problem for the particular subgroups of teachers in Years 1-3 and 4-5.

From interview data, two teachers described student dispositions, behaviour and student knowledge as constraining in relation to their practice using IWBs. They held views that students need to be disciplined to engage in independent work with the technology. The Year 1 teacher commented that some students are “not disciplined enough to work independently especially at the beginning of the year” (Yr 1b: Line 6)

and this caused issues for other children not being able to concentrate. As these Year 1 students completed this activity it was observed there were issues relating to the negotiation of turns, technical issues which required teacher intervention.

In Year 5, the classroom teacher found the behaviour and noise of students in an adjoining classroom restricted her use of the IWB. In relation to her own class, she commented that lack of knowledge and lack of computer skills constrained teaching and learning. She remarked that “a lot of these kids just take things for granted” (Yr 5: Line 2). She emphasised that she had to focus strongly on listening skills, thinking skills and ensuring a lot of modelling as “a lot of their learning isn’t spontaneous to them” (Yr 5: Line 8). She described her students of needing “a lot of that modelling and spoon feeding. I don’t like to call it spoonfeeding but um that’s another concern I have” (Yr 5: Line 8). She further commented that “you’ll be surprised the number of kids who do not know how to turn that computer on” (Yr 5: Line 34) as they had no computers or Internet access at home. Rather they only had access to televisions and gaming machines like Nintendo or Sony Playstations. Teachers’ beliefs about students’ dispositions, knowledge and behaviour shaped how these teachers used IWBs in their classrooms.

### **Summary**

In the seven months of whole-school implementation it was evident that IWBs influenced the school culture in relation to teaching and learning. After the early implementation phase, there had been continued development to embed IWBs into the fabric of school life. Further actions or critical events continued to shape reality for teachers in this school, as they sought to understand the notion of Multiliteracies translating into their practice. These events are identified in Table 4.3.

**Table 4.3 Critical Event Chart Whole-school Implementation of IWBs**

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Date	Event
April 2005	Whole-school implementation of IWBs
April 2005	Provision of professional development on how to operate IWBs and Smartboard Notebook software
June 2005	Professional Learning Team reports: Identifying future possibilities for IWB teaching practice and use, and support and resources needed to achieve this
November 2005	IWB questionnaire: Reflection on teacher beliefs and practices
December 2005	Research focus narrowed to enacting Multiliteracies: Interviews with select teachers and school Principal

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These events emerged as critical in focusing teachers' understandings about the impact of IWBs on their beliefs and practices. Teachers felt they had been supported by school administrators in their use of IWBs. The ILE committee focused on improved technical and organisational support. For classroom teachers and administrators, the need for renewed pedagogy became a focus, which included the construction of interactive learning environments. Reflective use of IWBs through Professional Learning Team Reports, my development of the IWB questionnaire, and interviews fostered and challenged this process. Teachers' sharing amongst themselves at year levels of was encouraged during allocated times for planning. Administrators provided leadership and management which saw them evolve to the Wisdom phase on the IWB Implementation Grid (Kitson, 2009) as shown in Table 4.4.

The provision of professional development in IWB technology and Smart Notebook was provided during whole-school implementation. Teachers felt supported, which was evidenced by experimentation and practice with the IWB. These circumstances aligned with the descriptor for the Awakening Phase depicted on the grid. Early adopters lead the way with their enthusiastic and confident use of IWBs with teachers using IWBs for different lengths of time and different content areas. However, teaching practices with the IWB revealed no significant change.

**Table 4.4 IWB Implementation Grid (Kitson, 2009) End of Phase 1**

End of Early Implementation					
End of Phase 1					
					Preferred Future
Measurement Categories	Stage 1: Uncertainty/Not evident	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty/ Embedded or Evident
<b>Leadership and Management</b>  Based on Kent (2003, 2008)	A few IWBs are featured in the school, however, there is lack of interest and support from school leadership to integrate ICTs into classrooms	Further IWBs are purchased, which are fixed within key classrooms. There is some sharing amongst teachers from these key classrooms. School leadership – starts to manage best ways to store teacher developed resources and tackle technical issues. 	School has multiple fixed IWBs in the majority of classrooms. School leadership is forward thinking in relation to problem solving for technical and organisational issues of IWB integration.	There is active interest and support from school leadership to have multiple fixed IWBs in classrooms. Establishment of school committee which focuses on improved technical and organisational support and improved pedagogy. Staff has some access to a greater variety of digital resources and dedicated time for team sharing and planning.	Schools have multiple fixed IWBs in classrooms and these are updated and maintained. School leadership supports the school committee in funding new initiatives. The school committee explores and purchases new software packages for different purposes. Teaching and assessment are explored for best ways to achieve improved student outcomes.
<b>Professional Development</b>  Based on Sandholtz, Ringstaff and Dwyer (1997)	Little in the way of professional development is offered to teachers as they try to implement IWBs into their classrooms. 	Training in operating IWB technology and basic software packages – Smart Notebook, Powerpoint, Word. Need for sharing and collaboration with peers. Teachers experiment with software.	Peer Observation and team teaching. Training in a greater variety of software packages to foster greater productivity. Alternative pedagogies should be encouraged.	Teachers undertake professional development on employing alternative pedagogies. Also there is a focus on a greater use of a variety of digital resources to support teaching and learning.	Professional development moves to a focus on using IWBs effectively in content areas. Teachers present at conferences -showcasing of teacher work. Writing and publishing of findings. Creation of support systems outside the school network. Mentoring of colleagues.

<p><b>Integration of IWBs into the curriculum</b> Based on Sandholtz, Ringstaff and Dwyer (1997)</p>	<p>Entry stage. Teachers are reluctant to try new things, reverting to traditional teaching methods. Teachers may experience problems with technical issues or the resources.</p>	<p>Adoption stage. A greater effort to integrate technology into daily lessons, but activity choice is limited to replicating existing teaching practice using technology.</p>	<p>Adaptation stage. A greater variety of software packages are starting to be used as time-saving tools. Teachers move beyond use for teaching purposes to classroom management and planning.</p>	<p>Appropriation stage. IWBs are used effortlessly as a tool to accomplish tasks. Greater student interaction, with students working with technology for curriculum related tasks.</p>	<p>Invention. Teachers experiment with pedagogical styles and interactions with students. Students actively construct knowledge, with student experts assisting teacher and peers with technological problems. Reflective teaching practice</p>
<p><b>Construction of Interactive Learning Environments</b> Based on O'Rourke (2001)</p>	<p>Learning environment created with IWB replicates existing instructional discourse. Interaction is teacher centred.</p>	<p>Engagement with IWBs is at the technical and practical levels of use. Motivation and interaction is defined in terms of physical manipulation of IWB and turn-taking.</p>	<p>Engagement with IWBS is still focused on turn-taking and surface engagement with flashy features of multimedia. Teachers start to consider activities and IWB resources which promote higher order thinking.</p>	<p>Engagement with educational content focuses on deeper understanding of the subject matter and involves substantive conversations.</p>	<p>The learning environment is engaging and motivating. It moves beyond pragmatic uses to critical and intellectual engagement with the subject matter, with knowledge viewed as problematic and open to multiple interpretations.</p>

The use of the IWB was extended to use for classroom management, transitional activities, and for planning purposes. Whilst acknowledging that teacher growth with ICTs varied, teachers' beliefs and observations suggested teachers were experiencing a sense of enlightenment in relation to teaching practice with IWBs. However, this had not yet progressed to changed pedagogy.

The IWB afforded different ways of completing activities and catered to different learning styles. Observation of teachers' practice indicated that teaching with IWBs focused more on physical and technical interactions with features offered by the software. Some teachers in Years 4-7 had started to engage students in conceptually more-challenging tasks. This suggests that they were beginning to operate at an enlightened level in the construction of interactive learning environments.

### **How Does the Implementation of Interactive Whiteboards Influence What Counts as Multiliteracies?**

#### ***Rethinking Literacies***

The Deputy Principal identified focusing on Multiliteracies to foster teaching practice with IWBs as one important aspect of professional development in his responses to the questionnaire. Through negotiation with the Principal, my research was narrowed to explore the notion of embedding Multiliteracies into teaching practice. A review of the literature indicated that teachers may be enacting some multiliterate practices in their classroom, so my focus shifted to exploring their current practices. It was anticipated that findings would inform the selection of possible cases for further investigation in Phase 2. Results for this section are based on an analysis of interviews with the School Principal and three teachers from Years 1, 5 and 7. Video-taped observations of these teachers' classrooms provided additional data. Findings are reported in relation to how the participants defined the terms *literacy* and *Multiliteracies*. These data allowed for an explication of how teachers and administrators construct everyday life in classrooms and schools. These constructions were important due to their influence on student learning and the model of literacy learning that was enacted in their classrooms.

## ***Defining Literacy and Multiliteracies***

Literacy and Multiliteracies were perceived differently by teachers. Definitions of literacy were broad and referred to foundational literacy skills, curriculum literacies, and the social and functional purposes of texts. The notion of Multiliteracies was a new one for teachers and many found it difficult to define.

Both teachers in Year 1 and Year 7 described literacy as a broad concept. However, for the Year 1 teacher it was a difficult notion to define as recorded in Table 4.5.

**Table 4.5 Interview Excerpt Teacher Year 1 Literacy Definition**

Interview Text	Analysis
R: It's a broad one. I: It is a broad one. R: Literacy involves a lot of things doesn't it ... um ... literacy to get the skills to read and write, to be active learners I guess.	Teacher has difficulty defining the term literacy. Interviewer acknowledges teacher's response. Teacher still has difficulty defining term, but describes it as skill based for reading and writing. Difficulty in getting a response.

The Year 1 teacher's descriptions related to foundational literacy skills for reading and writing. She also described oral language activities saying that, "they do their show and tell but I have lots of oral language games" (Yr 1b: Line 50). Observation of classroom practice reflected her construction of literacy during a writing activity, enhanced by the presentational and interactive features of the IWB. For example, in Year 1, students dragged and dropped text boxes and images, brought up the screen keyboard and adjusted font sizes to complete the task. This focus on multimodality for learning and demonstration of learning is constructed in her definition of what counts as Multiliteracies as described in Table 4.6. Once again, there is little elaboration of the concept. Both definitions of literacy and Multiliteracies shaped her teaching practice and the situated model of literacy constructed in her classroom.



**Table 4.6 Interview Excerpt Teacher Year 1 Multiliteracies Definition**

Interview Text	Analysis
I: What about the term Multiliteracies? How do you see, yeah, how would you define that and what do you think children need to be able to do to be multiliterate?	
R: They need a lot of different mediums. They need to learn in a variety of ways not one particular way. They need to learn to use a lot of different, different mediums as well.	Needs based Learning with and through multimodality
I: Yeah. What sort of, are there other different sorts of mediums you've used in the classroom apart from the interactive white board that you can think of? Sort of rather than your standard reading book or, are there other things that you use in the class even over this year or, examples you can think of?	Interviewer seeking to understand extent of teacher use of multimodal texts in the classroom
R: There's the white board and there's all the visual word walls and there's um making the classroom look as though what we are learning about. I label everything around the room as well, like, I don't know there's a lot of ...	Visual relates to Whiteboard and immersion in environmental print

The Year 7 teacher described literacy in broad terms (see Table 4.7), and spoke of literacy as inclusive of technology. She considered social and functional purposes of literacy for communication, and its application in different content areas.

**Table 4.7 Interview Excerpt Year 7 Teacher Literacy Definition**

Interview Text	Analysis
Literacy is everything in every classroom. It should be anyway, but, literacy is a combination of computer technology um being able to communicate in different ways, being able to understand the social purpose of that communication, um, understanding different literacies that are going on. You know a lot of kids don't think there is any literacy in maths, you know, and literacy. So um just being able to um do everything – spelling, communication, um, understanding other people from different cultures, ah, it goes on and on I guess (Yr 7: Line 16).	Teacher proposes that literacy should entail a very broad notion embedded in other content areas. Implies this may not be the case in her classroom or other classrooms. Literacy as plural Literacy as local and global Literacy for understanding

This teacher's description of Multiliteracies was closely aligned to her notion of literacy. Comparison of both definitions revealed a focus on acknowledging the place of technology, as an extension to more traditional forms of literacy for communicative purposes on local and global levels. She recognised this and explained how she has moved to a dominant Multiliteracies view as reported in Table 4.8.

**Table 4.8 Interview Excerpt Year 7 Multiliteracies Definition**

Interview Text	Analysis
(Laughs) Probably similar. I probably don't think of literacy on its own now. I probably just think of Multiliteracies and that's it. Um, very similar, you know, just extending, um, I know when I went to school and probably yourself it was just written communication and um and that was it really and so um just being able to extend it to communication and technology is the biggest thing um and then, and then globally of course. Opening up the world to the kids, so...	Extension to more traditional ways of doing literacy. Focus on communication in local and global contents

The Year 7 teacher's definitions of literacy and Multiliteracies shaped her classroom practice. In the activity observed she used the IWB as a presentational tool providing students with access to a range of more current Internet texts. This activity started with a whole class activity, where the teacher discussed career pathways. Using her life as an example, the Year 7 teacher modelled the actions she took to become a classroom teacher. A template was used to record these life decisions. After this, students moved to a small group situation, where they looked at biographies of different personalities (e.g. Oprah Winfrey) on the Internet. They recorded information about their personalities and their achievements using the same template. The IWB was used to present the Internet text, whilst students recorded key events on a notepad.

The Year 5 teacher also promoted a functional view of literacy as reported in Table 4.9.

**Table 4.9 Interview Excerpt Year 5 Teacher Literacy Definition**

Interview Text	Analysis
Um, literacy is to me, is being able to function in the world that, that you're part of and being able to, to understand what different, that there are different purposes for different types of text and things like that so I mean at the moment we are doing procedure text so that you know there is a purpose for that and you know even um in those they are a little bit different but I guess just to be able to function in the world that's out there for them and, um, yeah. (Yr 5: Line 26).	Literacy as functional Serves different purposes Literacy as text types

The Year 5 teacher's construction of literacy varied with her construction of Multiliteracies and like other teachers, acknowledged the role of technology and multimodal texts for teaching and learning. She stated that "this is (a Learning Object) a technology and another form of literacy" (Yr 5: Line 30). Her purpose for use was that

“it’s a good tool because it gives the kids a bit of understanding of what we are doing”  
(Yr 5: Line 30).

**Table 4.10 Interview Excerpt Year 5 Multiliteracies Definition**

Interview Text	Analysis
<p>Okay to be multiliterate I believe they should be able to, um, now let me see, Multiliteracies to me is...well for instance um, at, this term we are doing a technology and the visual diary. The technology log is a written response about the work that they have done in the previous, that week. What they’ve learnt and how that’s going to help them with their project and what the next step is and um then, that’s a very, written text. Whereas the visual diary is um more obviously visual images, pictures, graphs, ah, um, and they’ve all got captions on them, that sort of thing and that also describes, and there’s a couple of questions that, standard sort of questions, ‘how is this going to help with your learning’ and ‘what’s the next step’ and that sort of thing so there’s questions that they have to address even if it’s written or it can be done in visual so I just want them to know that there are different ways of reflecting on their learning, on the purpose of the learning. (Interrupted by student)</p>	<p>Differentiates between technology log which is written and visual diary</p> <p>Visual diary uses more visual means but also includes a focus on text (captions and questions)</p> <p>Different ways for reflecting on learning</p>
<p>Well to be multiliterate, that’s what I was trying to say with the technology log and the visual diary that I don’t want them to believe, because always in the past you’ve had journals entries and that sort of thing and the kids always had to write ‘what I did on the weekend’ as a journal entry and I’m trying to get away from that to let them know there is other ways to produce the same sort of text but in a different way, visually, whatever, but also as far as Multiliteracies, um, well with the technology side that um I mean I didn’t, you don’t need to have that um that biscuits thing to do this unit I would, I don’t need to have that but I think it’s a good tool because it gives the kids a bit of a um understanding of what we are doing and, and like for instance there was, if we were to go onto an advertising thing, which is what the good kids are going to do with the advertising story boards, well I stopped at theirs and then we’ll do that again the next time sort of thing. So I want them to understand that, that this is a technology and another form of literacy that we have to understand and um and even so like the um you know when Wesley typed up delights that different way, that, that, you know, that not all everything is spelt the right way and we went of a lot of talking about that cause you know how they right ‘lite’ on the things and that sort of thing so we had a big a discussion about that and so that I yeah from as far as Multiliteracies that light can be spelt in different ways for different purposes and you know so I mean, just think, just showing them different ways and different things that, yeah, things that...</p>	<p>Other ways to produce texts done previously in a visual format.</p> <p>Technology not integral to learning, but a valuable tool.</p> <p>Multimodal texts as another form of literacy.</p> <p>Some texts use different techniques to achieve their purpose.</p>

During classroom observations in Year 5, students used a multimodal Learning Object. Constructions of what counted as Multiliteracies reflected the teacher’s notions that students should be exposed to different forms of literacy. However, the teacher countered that it was not integral to students’ learning. This activity also reflected her

belief that students need to be connected to their lived experiences as active consumers of advertisements with knowledge of how choice of language features influences marketing outcomes. The Year 5 teacher believed that there was a need for students to develop technological skills, but she indicated uncertainty as to the relevance of ICT skills to what they would achieve outside school. In Table 4.11, she described her students as more active consumers of gaming machines and television rather than personal computers, suggesting a notion of deficit.

**Table 4.11 Interview Excerpt Year 5**

Interview Text	Analysis
I: What um, what sorts of skills do you think the children need to be able to have to cope outside um school?	
R: Um, these kids or kids in general?	Does not wait for response
I: Ah, that's an interesting question.	
R: These kids, these kids here, a lot of them just need basic social skills you know which they don't have but I mean they still need all of the literacy stuff and all this sort of thing and um how much of what, you know I mean we've got all of the high tech literacy, um, technical stuff in here now but I just don't know how much these guys are going to be exposed to this sort of thing cause I mean it would only be a very small majority of them that would end up at university and that sort of thing. A lot of them still don't even have computers at home and um you know they are talking about having a um what do you call them digital portfolios and like we have said well you've got to survey the schools cause you'll be surprised the number of kids who do not know how to turn that computer on and um and work it because they do not have computers at home or they don't have the Internet so, this, just that over there is a lot of technology for a lot of them. Mind you they've got the Sony and the Playstations and all of the TV's and the digitals and that sort of thing but as far as working digital, you know technology, you know I don't know that they have a lot of exposure to but they've all got the TV's in their bedroom.	<p>Student needs – social skills, literacy skills</p> <p>Uncertainty about whether students will use ICT skills in their lives. Links technology to higher education</p> <p>Limited notion of achievement for students.</p> <p>Students as active consumers of gaming machines and television.</p>
I: Oh, okay.	
R: Yeah, you know, so it's different priorities and um...	
I: Do you find some of those, with some of those kids who don't have the computers at home but they have the TV's that some of those skills transfer or do they get stuck?	
R: They do...um, for some of them they might, um, honestly I do technology on a Wednesday afternoon I would spend most of time, and I get half an hour, and I would spend most of my time just logging kids, helping kids to log on because they don't know and they just press, press, press, press.	Frustration at lack of skills of some students

I: Yeah, oh, okay.

R: And, so you know, and its, but then you've got a lot of other kids who can help them but um but there are just some kids who just don't have any idea and um...

Peer tutoring available

Deficit notion of students in relation to ICT skills

As with teachers, the Principal struggled to define this term. His view of Multiliteracies was an evolving concept as indicated in Table 4.11, with espousals indicating there was one correct way to achieve this. His construction of what Multiliteracies should entail was disrupted by his encounter with websites that prioritised the use of written texts over other modes of communication. Whilst not negating the place of written text in the communication process, he valued the use of visual texts for presentation purposes.

**Table 4.12 Interview Excerpt Principal Multiliteracies Definition**

Interview Text	Analysis
Yeah. How would you define the term Multiliteracies or what do you think you would need to be able to do to be a multiliterate person?	
Still working on that. Still have not got that right. I um went to QSA yesterday to sit in a little workshop with some (don't know) people to discuss their website and the website is um used to publish a lot of their work and that it is full of text. It's full of nothing but text.	A correct way of being multiliterate Multimodal texts still prioritise written text
Oh okay. So no visuals.	
Not really	Minimal visuals
Not really, okay.	
So I mean it is visually on the web but the publications are text and it is interesting to talk to people and suggest otherwise because we talk to a generation that loves text, my age group who are very interested in enhancing the bibliographies and the reference material because they are independently on their life long journey not working for any particular credential or any tertiary qualification. They still want the rigor of, of that type of research (not sure about research as the word). Multiliteracies to me is a step into the twenty first century that includes a whole range of knowledge about visual presentation. It is really including text of course but including a whole lot of creative possibilities um that another um idea is to be composed in a variety of ways and in a digital context. That is quite extreme really you know when you go from software like Flash and Powerpoint um to word processing I suppose and all the rest of it but the sophistication of hyperlinking to illustrate your point, more information at that point of time. To be able to engage in dialogue in real time for real purposes with different people and different places, data conferencing, video conferencing, are all a part of the multiliterate world we now live in.	Links notions of visibility to availability of text for viewing. Focus on written text as generational.  Valuing of visual presentation, inclusive of text. Creativity of composition  Access to more information Authentic use for a range of purposes linked to dialogues and communication

Central to his emerging understandings and construction of Multiliteracies was a need for authentic and effective communication that would link together different people in different places. Instances of this usage within the school were not observed at this point in time, perhaps due to the evolving nature of his conception of Multiliteracies. He later elaborated on quality of communication, emphasising his belief that “it’s the quality of the communication it makes” (P: Line 54), and the “depth of intellectual engagement has occurred in the person who has created it....you can make some very shallow stuff with cut and paste” (P: Line 56).

Definitions of literacy and Multiliteracies were evolving as teacher beliefs about the nature of these concepts were being situationally defined, redefined, modified and extended within and across time in using IWBs during this implementation phase. What counted as Multiliteracies centred on the inclusion of technology to achieve a variety of purposes: the ability to function, in particular for reading and writing purposes, and the ability to communicate through presentation for local and global audiences.

If this is compared to the multimedia and ICTs dimensions of multiliterate practices which Cope and Kalantzis (2000) promoted, this was highly evident. Teachers and the Principal all signalled the place of ICTs and multimedia for teaching and learning purposes, and for the demonstration of student learning. Whilst these shaped teacher beliefs, classroom constructions revealed minimal attention to using a metalanguage to describe the meaning making of these modes. Cultural and linguistic diversity was acknowledged but often regarded in deficit tones. Similarly, a critical literacy perspective did not appear in teacher definitions or classroom constructions of Multiliteracies.

### ***Where To From Here?***

For the Principal, Multiliteracies was an evolving concept. A focus on multimedia and Multiliteracies was identified as an area needed for professional development to foster teachers’ practice with IWBs. There was evidence of some aspects of Multiliteracies in teachers’ practice. During this phase the notion of Multiliteracies or beliefs about Multiliteracies and how their beliefs were enacted in the classroom centred on the use of ICTs/IWBs and multimodal texts. The development of


functional and technological skills was the predominant view of what counted as Multiliteracies. There was acknowledgement of the visual modes of communication; however, there was only minimal evidence from one teacher of a metalanguage to describe the meaning making of different modes of communication. Similarly, sensitivity to the ideology underpinning texts and the needs of culturally and linguistically diverse students were limited in the data. This would place teachers and the Principal at the awakening phase on IWB Implementation Grid (Kitson, 2009) in relation to Multiliteracies (see Table 4.13).

### **Chapter Summary**

The teachers in this primary school had commenced a journey to realise the implementation of IWBs. Analysis of data allowed description of how teachers' beliefs and practices were shaped by the process but also indicated that their traditional teaching practices were transferred to IWBs rather than transformed. Findings indicate there were several critical events that had set in place the processes and conditions which supported the effective use of IWBs. An important event was the decision of school's Administrators to realise the implementation by purchasing a small number of IWBs initially, selecting key teachers who would lead the way as *early adopters*, and supporting a committee to manage technology and issues.

*Early adopters* were well selected. They responded as enthusiastic, confident and reflective in their use of the IWBs when installed. Their enthusiasm and confidence encouraged other teachers in using the technology as it was introduced progressively. Knowledge of how to use IWBs was produced collaboratively and was continually constructed and reconstructed during the course of the whole-school implementation. Seven months after implementation throughout the school, teachers' use of IWBs had extended to a greater range of content areas, particularly in Years 4-7. In relation to literacy, teachers across the year levels used the IWBs for different purposes. In Years P-3 the IWB was used mainly for foundational literacy and numeracy skills. In Years 4-7, a broader notion of literacy was enacted, that of literacy embedded within other content areas.

**Table 4.13 IWB Implementation Grid (Kitson, 2009) Multiliteracies Phase 1**

End of Phase 1					
Measurement Categories					Preferred Future
	Stage 1: Uncertainty/Not evident	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty/ Embedded or Evident
Understanding of Multiliterate practices	No understanding of the changing contexts of literacy – literacy as a social practice.	Literacy as social practice. Acknowledgement that literacy is learned through Primary and Secondary Discourses. There is valuing of student diversity at the individual level. There is inclusion of multimodal texts and some attention to the different semiotic systems they use.	Teachers conduct audits of students’ literacy resources. An awareness of how deficit notions inform teachers’ understandings of students’ capabilities. Greater access to and use of new forms of literacy (multimodal texts) in a range of contexts. Some explicit teaching in relation to the meaning-making of the various semiotic systems. Some awareness on the selection and manipulation of resources to convey meanings to influence the reader.	Valuing of the diversity of students’ experiences and backgrounds at the collective level is evident in teaching. There is explicit teaching of semiotic systems of meaning making, using a meta-language to describe. Greater attention to the selection and manipulation of content to influence the reader.	Teaching incorporates all aspects of multiliterate practices - Multimedia and ICTs, Semiotic systems, Critical literacy, and cultural and linguistic diversity. This is embedded in real life contexts using a range of authentic texts. Focus on literacy demands of curriculum areas.



There were no significant changes to teaching practice with IWBs, rather the IWB afforded new ways of approaching teaching tasks and activities. However, some teachers suggested it was not the activity or teaching practice but rather how students could carry out the activity that was important. The high visual appeal of the IWB engaged students with enhanced interactivity allowed by modes of communication for visual, auditory and kinesthetic learners. Observation of teaching practice revealed that interactions were mainly of the physical and technical nature. Only a few teachers had started to use the IWB for developing conceptual interactivity.

Supported by administrators, teachers' confidence with ICT, support amongst peers and professional development all contributed to the effective implementation of IWBs. However, teachers highlighted a need for ongoing professional development in relation to software use, content areas, and pedagogical issues such as creating the ideal learning environment. Constraints teachers saw in relation to their classroom practice related to the practical dynamics of sharing and locating IWBs, technical issues such as insufficiencies in the knowledge and skills of students, and difficulties in juggling management of the behaviour of students with promotion of their engagement as learners.

Administrators identified the need for professional development about Multiliteracies if they were to improve their practice with IWBs. However, *Multiliteracies* was a new term that they grappled with as they worked with multimodal texts. For the Principal, the concept of Multiliteracies was an evolving one. For some teachers, their beliefs about Multiliteracies represented an extension of traditional print-based literacies. For others it was inclusive of technology and global communication. Observation of teachers' practice revealed use of multimedia and ICTs, and there was acknowledgement of the place of visual modes. However, there was limited reference to discussion about the semiotic systems these texts employ or a meta-language to describe them. Similarly, there was little reference to cultural and linguistic diversity or critical literacy, which is an important aspect of multiliterate practice with IWBs. These were early days as teachers struggled with the realities of constructing literacy practices within technology rich environments which offered a range of multimodal texts.

In the next chapter, I report results for Phase 2.

## **CHAPTER 5**

### **RESULTS: PHASE 2**

Phase 2 involved an intensive study of the school site and focused on investigating the phenomenon of Multiliteracies. Data were collected over the four teaching Terms in 2006. Data sources were artefacts, fieldnotes from meetings, classroom observations recorded as written fieldnotes or video records, teacher interviews and informal conversations including email communication, planning documents, teacher reflections, and two survey instruments. Results reported in this chapter address the following questions:

1. How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?
2. How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?

Results for Phase 2 record the continuing journey undertaken by teachers and administrators and examine how their beliefs and practices are shaped by the implementation of IWBs in their classrooms. Findings are structured to attend to the different units of analysis of this study. First, I report findings in relation to the whole-school level for espoused beliefs and enacted practice in relation to IWB integration and Multiliteracies. Second, to focus the study and to reveal both collective and individual beliefs and practices in relation to Multiliteracies, I report findings for one Professional Learning Team of four teachers. Finally, results from a case study of one teacher within this team are provided. To summarise the continuing journey of this school community, the IWB Implementation Grid (Kitson, 2009) is used to plot findings, allowing comparison with findings from Phase 1.

## **How are Teacher Beliefs and Practices Shaped by the Implementation of Interactive Whiteboards at the Whole-school Level?**

### ***Moving Forward***

During Phase 1, whole-school implementation of IWBs was facilitated by the strategic actions of school administrators. Teacher integration of the IWB was driven by the technology, with teachers using it to replicate existing teaching practice. However, a change in focus to one of a pedagogical nature was signalled midway through Phase 1 but not enacted.

Table 5.1 documents and examines data all collected through researcher attendance over the course of this phase at the whole-school level. These events represent a snapshot of the everyday realities of the schools as they are constructed through meetings, records and documentation. The first and second columns detail the date and type of data source in relation to 21 events. In columns three and four, two types of analysis are reported. First, events are reported for how Multiliteracies (Cope & Kalantzis, 2000) was conceptualised and how different dimensions of practice are described. Second, column four represents my interpretation of key themes in relation to Multiliteracies, and whether these were espoused beliefs or enacted practice at the whole-school level. Events or artefacts shaded in yellow signify critical events that shaped and influenced the social realities of this school. These events were turning points or moments in time in the school's efforts to understand Multiliteracies as teachers implemented IWBs in their classrooms.

### ***An Espoused Vision for IWBs***

At the beginning of Phase 2, administrators continued to have a clear vision for IWB implementation and integration which evolved around three key ideas: creating meaningful learning experiences for students, embracing new pedagogies by teachers and, serving the local school community by creating an ICT learning hub.

The Principal believed that ICTs were to be used to create meaningful learning experiences for students that allowed opportunities for higher order thinking, visual thinking, creating, and communication (SP: FN). He wanted students to go beyond technical and physical engagement with the IWB to achieve a deeper level of learning or conceptual engagement.

**Table 5.1 Whole-school Events**

**Critical Events**

Date	Event	Multiliteracies (Cope & Kalantzis, 2000 )				Comments
		MM & ICT	SS	C/L div	CL	
	<i>Data source: FN = Field Notes A = Artefact</i>					MM = multimedia ICT= information communications technology SS = semiotic systems C/L Div = cultural/linguistic diversity CL = critical literacy
25/01/06	Meeting with Principal (FN)	✓	✓		✓	<b>Espoused</b> - Integration of IWB and the development of effective pedagogy. ICTs for visual thinking, creating and communication. Engagement should promote technical, practical and critical engagement
31/01/06	Staff Meeting (FN)	✓				<b>Enacted</b> - IWB used to present agenda. Also daily notices. One located in staff room presently. Issue with IWB – quotas for network server
20/02/06	Literacy Committee Meeting (FN)	✓		✓		<b>Espoused</b> - Discussion around upgrade of Literacy Plan, in particular the community literacy profile. Only reference to technology – Professional development reading – “Making sense of online text” Discussions on purchasing more print-based resources as considerable funds spent on IWBs. <b>Enacted</b> - IWB used for agenda and recording of minutes.
20/02/06	Literacy Plan 2001-2004 (A)	✓		✓	✓	<b>Espoused</b> - Traditional print based notion of literacy, focused mainly around reading and writing. Outdated community profile provided. Technology referred to as a resource for the Literacy Block.
27/02/06	Curriculum Committee Meeting (FN)					<b>Espoused</b> - Discussion about year level literacy and numeracy data. No mention of technology.
28/02/06	Staff Meeting (FN)	✓				<b>Enacted</b> - IWB in staffroom moved to another classroom. School operational matters discussed. New IWBs had arrived and being installed. Check IWBs for daily notices and intranet information.
1/03/06	Learning agreement Report (A)	✓				<b>Espoused</b> - Vision Statement. Learning hub to serve community. ICT fabric of curriculum to promote meaningful, engaging learning experiences for all students.
13/03/06	ILE Meeting (FN)	✓				<b>Enacted, Espoused</b> Agenda on IWB. Discussion on Easi-teach software. Audit of IWBs and school visits, Sharing of websites
14/03/06	Staff Meeting (FN)	✓			✓	<b>Espoused</b> - Updated Literacy Plan Discussion in year levels – mention of Multiliteracies generally, no one mentioned the inclusion of the IWB as a resource. Mention of Four Resource Model. No literacy committee in 2005 as they had a big focus on IWBs (literacy and numeracy embedded). Focus on reading, running records, Data analysis from years 3, 5, 7 tests in reading and writing
18/03/06	2006 Showcase Awards for Excellence in Schools (A)	✓				<b>Espoused</b> - Acknowledgement of digital natives. Priority in 2006 will be the development of ICT pedagogies and digital teaching resources. Other goals – initiation of Student Digital Portfolios, the construction of a school website, improved assessment and reporting, a commitment to ongoing professional development, completion of Community Learning Centre
18/03/06	ICT Individual and Organisational Self-Evaluation Tool (A)	✓				<b>Espoused</b> - Appendix document to Showcase Award. All staff completed this document. Majority of teachers (75%) are at an establishing level of ICT integration and curriculum delivery. 75% of teachers felt the school was using ICT in most KLAS, which is improving teaching and learning

18/03/06	ICT Skills profile 2005 Knowledge, understanding and competence with ICT (A)	✓			<b>Espoused</b> - Appendix document to Showcase Award. Levels of staff competency in using ICTs for communication, research, data operation, desktop publishing, presentation skills, operating systems
20/03/06	Literacy Committee Meeting (FN)	✓		✓	<b>Enacted</b> - IWB being used to type minutes. <b>Espoused</b> - Literacy Plan– Classroom Organisation and Pedagogy. Wanting to fit recommendations of Literate Futures (Ed Qld, 2000). General mention of Multiliteracies in addition to aspects of previous Literacy Plan.
22/03/06	School Visit (FN)	✓			<b>Enacted</b> - Visiting school views IWBs being used in various classrooms. Discussion by Chair of ILE committee about storage issues.
22/05/06	Curriculum Committee Meeting (FN)	✓		✓	<b>Enacted</b> – Use of IWB for agenda. <b>Espoused</b> - Reading comprehension discussed in relation to the use of PM Benchmarks – use of PM benchmarks for appraisal, especially for ESL students. Intel Course, National Literacy and Numeracy Assessment Program, Round the Twist Unit published.
24/07/06	ILE Meeting (FN)	✓			<b>Enacted</b> – Use of IWB for agenda. <b>Espoused</b> - school webpage update, Learning Centre, Digital Year books, 8 Digital cameras donated – only take 8 photos.
31/07/06	Literacy Meeting (FN)	✓			<b>Enacted</b> - National Literacy Numeracy
7/08/06	Curriculum Meeting (FN)	✓			Literacy/Numeracy Testing – operational aspects
30/10/06	Literacy meeting (FN)	✓	✓	✓	<b>Espoused</b> - Continuing work on Literacy Plan 2006-2009, Literacy Budget, New Syllabus – example of implementation in Year 5 Unit Plan
6/11/06	ILE Meeting (FN)	✓			<b>Enacted, Espoused</b> – IWB Network Support South Coast Region, Procedures for technical problems and bookings for Learning Centre.

The Principal's espoused beliefs had a significant impact in the direction the school followed in using IWBs. He espoused a transformative approach to learning where the technology provided students with opportunities to move beyond being consumers and comprehenders of text to creating their own multimodal texts. For example, he felt that students should not just deconstruct computer games, but also produce them. The Principal's view was based on the work of O'Rourke (2001) who suggested that engagement could be considered from 3 perspectives: technical, practical and critical. A technical focus related to how to use software and hardware, whereas a more practical focus was based on achieving a particular purpose applying this technical knowledge. A critical focus was based on being able to "read the world" (SP: FN).

The Principal linked this learning to teaching. He felt that "a significant change in student learning outcomes was not in evidence until a change in pedagogy occurred" (SP: FN). The move to embrace new pedagogies was espoused in the artefact "2006 Showcase Awards for Excellence in Schools which was collected on the 18/03/06. In this document the IWB was promoted as a "digital resource tool" and a "display technology," which promoted the need for teachers to embrace new pedagogies. Pedagogical change was considered an important goal which was linked to improved learning for students.

As well as promoting meaningful learning experiences for students, the Principal espoused a vision that the school broadens this notion to include the local school community. This was supported in the Learning Agreement Report (01/03/06, Table 5.1), which stated that the school was:

... committed to establishing equitable pathways to life-long learning opportunities by creating a school that is a learning hub for the community serving the needs of students and their families by providing anywhere, anytime access to educational technologies and on-line learning. ICT is pervasive throughout the school, embedded into the fabric of the curriculum and used to promote meaningful, engaging learning experiences for all students. (Learning Agreement Report)

Advancing the social realities of this school as a digital learning hub was evident in the beliefs and actions of the Principal as he sought to direct and support his teachers in their work with IWBs as a teaching and learning tool. This process is described in the next section.

## *An Enacted Vision for IWBs*

Administrators were conscious of the need for teachers to change the way they taught with the IWB if their espoused beliefs were to be enacted. They identified three factors as essential in this process: creating meaningful learning experiences, embracing new pedagogies, and creating a digital hub that would serve the school's local community.

At the commencement of Phase 2, teachers had undertaken professional development that aimed to help them design more meaningful learning experiences for students. The Principal, (See Table 5.1 - 25/01/06) informed me that staff had attended a professional development on how to integrate ICTs effectively into the curriculum. This professional development was intended to focus on the effective integration of ICTs into the school curriculum, not just for engagement but for a deeper level of learning.

In an effort to enact his vision where ICTs would help students to achieve higher order processes, including visual thinking, creating, and communicating, the Principal continued to fund teachers' further professional development. They used this funding to participate in the Microsoft Intel Teach Program and training for the ICT Pedagogical Licence that was provided by Education Queensland. The Intel Teach Program focussed on the integration of technology for engagement and the realisation of learning outcomes, "promoting problem solving, critical thinking and collaboration skills" (<http://www.intel.com/education/teach>). However, not all teachers undertook these additional training opportunities; some even impeded others. For example, one teacher who was facilitating the Intel Program advised her fellow teachers in Year 7 not to participate in the Intel Program as it provided similar opportunities to what they had already experienced in the who had already participated in training for the ICT Pedagogical Licence. She did this at the ILE meeting on 24/07/06 (Field Notes: 24/07/06).

An additional opportunity for teachers to develop their understanding and practice was working with other teachers from their year level in Professional Learning Teams. These teams were established by the administrators to encourage a learning community, where a culture of collaboration and collective responsibility for the development of effective teaching practices was fostered. In these teams and during dedicated planning time, teachers would engage in planning and sharing of practices

and resources. In relation to the Intel program, they worked collaboratively in their Professional Learning Teams to develop a unit plan which embedded ICTs into learning activities. Professional Learning Teams were viewed as central to enacting changed teaching practice with IWBs.

The vision to embed ICTs into the fabric of the curriculum included assessment. At the ILE meeting on the 13/03/06, some teachers described how they had started developing digital portfolios of work that would be shared with parents in three-way conferences. This resulted in considerable discussion about the value of this practice. For example, one teacher commented that parents prefer to see the samples of work as opposed to photos of the samples and that she felt that “our community may not be ready for this” (Field Notes). This echoed a similar sentiment expressed by a teacher in Phase 1 who viewed digital portfolios as pointless if parents didn’t have computers at home that allowed for work samples to be viewed.

Analysing the school events and artefacts during this phase enabled the following patterns of use for the IWB to be identified: for administrative purposes, as a recording tool, and as a presentation tool. For the majority of events, the IWB had been used as an administrative tool for the circulation of daily staff notices and meeting agendas. In some meetings, it had been used also for recording purposes, either for the recording minutes or feedback from staff, particularly in relation to creation of the school’s new Literacy Plan. For one event on 14/03/06 one of the Deputy Principals had constructed a PowerPoint presentation to cover key points she was addressing.

The creation of a digital hub to serve the school’s local community and families had been espoused at the onset as a goal for this school and the Community Learning Centre was established later in Phase 2. This centre housed library facilities, enough computers for classes to use in a laboratory situation, and a space that contained whiteboards which were to be used for professional development and meetings. This professional development space was open to bookings from groups both outside and inside the school. On several occasions it was used to hold district meetings for teachers working with IWBs. The centre was not only a significant change to the schools’ physical design, it also contributed to a cultural change where technological resources were made more accessible to staff and for the first time in this school’s community to families and others in the general public.



### *The Reality of School Life ... Constraints*

As technology and particularly IWBs became more widely available across the school, technical issues emerged that affected teachers' practice. In the ILE meeting on the 13/03/06 (See Table 5.1) the Principal organised an audit of all IWBs as some teachers had reported problems with them. The need for teachers to clean out the previous year's digitally-stored material was discussed in the first staff meeting of the year on the 31/01/06 (See Table 5.1) as there was a quota and exceeding the quota caused problems. This issue was mentioned also in the school visit on the 22/03/06 (See Table 5.1). The chair of the ILE committee had advised visiting teachers that this school had a dedicated drive on the network partitioned into student work, content areas, and year levels. However, in spite of this management and forethought, there were still problems with saving files to incorrect places, unlabelled lessons, and numerous versions of the same lesson. It was evident that teachers were creating numerous digital folders but there was no organisational strategy put in place to manage and archive such data.

Another cause for concern emerged when the Community Learning Centre was being constructed and existing computer facilities located in the library were disrupted. This issue had implications for the whole school as staff recognised a potential disaster when critical data had to be altered - such as assessment items which were reliant on technology.

At the whole school level in Phase 1 the support of administrators was viewed as an affordance in the role of the IWB in the teaching and learning process with IWBs. However, by mid-2006 this had changed and the change proved to be a constraint. For example, there were key staff movements, with the Deputy Principals on leave or secondment in Term 2, the Principal's retirement at the end of Term 2 due to family circumstances, and other changes to the Administration Team from Terms 1 until Term 4. The Principal's vision that IWBs would be embedded into the school was not enacted. Whilst these variations were not anticipated at the beginning of the year, the radical change of administrators resulted in a shift in the school's priorities. Performance results in Literacy and Numeracy now dominated the agenda set by the school's administrative team as indicated in meetings on the 27/02/06, 14/03/06 and 31/07/06 (Table 5.1.)

## **How Does the Implementation of Interactive Whiteboards Influence what Counts as Multiliteracies at the Whole-school level?**

At the end of Phase 1, administrators had identified a need for professional development to advance teachers' practices with IWBs. As whole school documents shape, guide and provide direction for teachers' practice, it was important to consider how the notion of Multiliteracies and the dimensions of practice involved in teaching Multiliteracies were conceptualised and evidenced in these documents or events.

### ***Literacy as Print-based***

One key event reported in Table 5.1 was the first Literacy Committee Meeting held on 20/02/06 which focussed on the updating of the existing Literacy Plan 2000-2004. Administrators had recognised the need for updating the Plan, in light of new opportunities offered by the IWB. This meeting was significant as it was an occasion of considerable discussion about how teachers might enact teaching approaches consistent with IWB implementation. However, the Literacy Plan projected a view of literacy as print-based with a predominant focus on reading and writing. Instruction was described using a two-hour Literacy Block as an organiser, applying a whole class/small group/whole class model for planning teaching and learning (Hill & Crevola, 1999). The overarching aim of this document was described as a "general design for improving learning outcomes" (Literacy Plan).

The Literacy Plan espoused a "balanced approach to literacy" (Literacy Plan), acknowledging speaking, listening, reading, viewing, writing and presenting. All of these terms are or have been evident in describing literacy in the Queensland English curriculum documents, with the exception of "presenting". While this aspect might normally be associated with the oral mode, this document suggested an extension of this to a more practical focus for presentations meeting a range of purposes.

A series of activities was promoted in the school's Literacy Plan: reading aloud/modelled reading, shared reading, interactive reading, guided reading, independent reading, writing aloud/modelled writing shared writing, interactive writing, guided writing and independent writing. No specific strategies were suggested for speaking, listening, viewing, or presentation. An appendix within this document

depicted the Four Resource Model (Freebody & Luke, 1990) as a framework for planning a balanced program of literacy experiences.

### ***What Counts as Multiliteracies***

*Multiliteracies* is used as a term only once in the 21 events documented in Table 5.1. Its only mention was when the Deputy Principal on the 20/02/06 provided Literacy Committee members with a professional development reading titled, “Making sense of online text”. In my further consideration of what counted as Multiliteracies, data were analysed based on descriptions of multiliterate practices by Cope and Kalantzis (2000) as identified in column three in Table 5.1. Evidence of these dimensions would support the conclusion of enactment of a Multiliteracies approach to teaching. Results are reported in the following section.

### ***Multimedia and ICTs***

The first dimension, *multimedia and ICTs*, was evident as the IWB was embedded into all aspects of school life. Teachers used a variety of software packages and multimodal resources for teaching and learning purposes. In whole school data, 18 events or artefacts (Table 5.1) included reference to multimedia or ICTs. In most instances, these related to use of the IWB in presenting agendas for staff and committee meetings. Hard copies were often provided so that attendees could write notes or later discuss items with colleagues in their year levels. Administrators were conscious of using IWBs for daily purposes with staff notices uploaded on the school intranet. In the first staff meeting of the year on the 31/01/06 teachers were reminded to avail themselves of this information source. Other instances were reference to technology as a resource in a balanced range of literacy activities for the literacy block in the Literacy Plan provided on 20/02/06. In the first Literacy Committee Meeting on the 20/02/06, attendees were provided with two academic readings about reading comprehension, and one of these related to online texts. This school had embraced the use of multimedia and ICTs through its whole school implementation of IWBs which was a driving force behind the school use of technology.

### *Semiotic Systems*

The use of such technology should lead to a recognised understanding of the role that semiotic systems play in a Multiliteracies approach to curriculum. Two events made reference to the semiotic systems employed by multimedia and ICT texts. The first event on 25/01/06 related to comments made by the Principal on the same day when discussing critical engagement with ICTs. He provided an example of such critical engagement as when students not only look at computer games but also express themselves through multiple modes of communication. The second event was an artefact, provided in the Literacy Committee Meeting on 30/10/06. This was a Year 5 Unit titled, "Aussie made and proud of it," which was used as a model for how to implement a draft English syllabus document. In particular, learning outcomes looked at construction of meanings using a variety of advertising texts, which included cereal boxes and breakfast cereal advertisements. All of these examples were espoused, but there was no evidence of enactment in practice. The notion of semiotic systems was framed as multimodal texts are recognised as a required element of the curriculum. How to do this was not addressed and not evident in any data collected during this phase.

### *Cultural and Linguistic Diversity*

Recognising and planning for the diverse needs of students is an essential consideration in developing and applying a Multiliteracies approach to teaching.. References to cultural and linguistic diversity were espoused in three of the 21 events and artefacts. First, there was discussion in the Literacy Committee Meeting on 20/02/06 about updating the Community Literacy Profile. An outdated version had formed part of the Literacy Plan 2001-2004. The Literacy Plan 2001-2004 was the second artifact. The third event focused on discussion of the reading comprehension performances of English as second language (ESL) students in a Curriculum Committee meeting on the 22/05/06. This discussion recognised the need to ensure teachers accurately diagnose students' reading levels, in particular those of ESL students, even though they may appear on the surface to be age appropriate. No evidence supporting action on these discussions was recorded across the period of this research.

## ***Critical Literacy***

The inclusion of multimodal texts in the curriculum recognises students' need to view texts critically and that they are taught how to do this. Critical literacy practices were espoused in five events or artefacts. On the 25/01/06, the Principal espoused critical engagement with ICTS as discussed by O'Rourke (2001) which allows students to "read the world" as well as "read the word" (SP: FN). Three instances as indicated in Table 5.1 involved implicit references to the Four Resource Model (Luke & Freebody, 1999), which includes the role of text analyst. The model was also evident in the Literacy Plan. One event involved the aforementioned Year 5 Unit example. The unit included a focus on the Critical Strand of the Draft English Syllabus. Its learning outcomes were that students would know, "that all texts (written/visual) are not neutral and are influenced by the creator's own belief and value systems". Further it sought that students would, "identify evidence of stereotyping or discrimination in the packaging of promotional materials" (Unit Plan).

## ***Summary of Whole-school Findings***

At the whole school level, the influence of IWBs on beliefs and practices has been described in three areas. These were: *leadership and management*, *professional development* and, *multiliterate practices* which have been plotted on the IWB Implementation Grid (Kitson, 2009) as shown in Table 5.2. By the end of this phase, leadership and management espoused a vision for the school which was partially enacted through the completion of the Community Learning Centre and ongoing professional development for staff. The retirement of the Principal at the end of Term 2 due to unforeseen circumstances interrupted this vision. These competing realities meant a change in the focus of attention. Now, the imperative was on students' performances with literacy and numeracy – on outcomes rather than processes. There was growth in professional development through increased opportunities for teachers to engage in more effective use of ICTs. However, this professional development focused on higher order thinking rather than on a particular concentration on Multiliteracies or Multiliteracies pedagogy. The implementation of the IWB influenced what counted as literacy, with recognition of the need to update school documents.

**Table 5.2 IWB Implementation Grid (Kitson, 2009) End of Phase 2**

	<div style="display: flex; justify-content: space-between; align-items: center;"> <span style="background-color: #c8e6c9; padding: 2px;">End of Phase 1</span> <span style="background-color: #ffe0b2; padding: 2px;">End of Phase 2</span> </div>				Preferred Future
Measurement Categories	Stage 1: Uncertainty/Not evident	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty/ Embedded or Evident
<b>Leadership and Management</b>  Based on Kent (2003, 2008)	A few IWBs are featured in the school, however, there is lack of interest and support from school leadership to integrate ICTs into classrooms	Further IWBs are purchased, which are fixed within key classrooms. There is some sharing amongst teachers from these key classrooms. School leadership – starts to manage best ways to store teacher developed resources and tackle technical issues -	School has multiple fixed IWBs in the majority of classrooms. School leadership is forward thinking in relation to problem solving for technical and organizational issues of IWB integration.	There is active interest and support from school leadership to have multiple fixed IWBs in classrooms. Establishment of school committee which focuses on improved technical and organizational support and improved pedagogy. Staff has some access to a greater variety of digital resources and timetabled time for team sharing and planning.	Schools have multiple fixed IWBs in classrooms and these are updated and maintained. School leadership supports the school committee in funding new initiatives. The school committee explores and purchases new software packages for different purposes. Teaching and assessment are explored for best ways to achieve improved student outcomes.
<b>Professional Development</b> Based on Sandholtz, Ringstaff and Dwyer, 1997)	Little in the way of professional development is offered to teachers as they try to implement IWBs into their classrooms.	Training in operating IWB technology and basic software packages – Smart Notebook, PowerPoint, Word. Need for sharing and collaboration with peers. Teachers experiment with software	Peer Observation and team teaching. Training in a greater variety of software packages to foster greater productivity. Alternative pedagogies should be encouraged.	Teachers undertake professional development on employing alternative pedagogies. Also there is a focus on a greater use of a variety of digital resources to support teaching and learning.	Professional development moves to a focus on using IWBs effectively in content areas. Teachers present at conferences - showcasing of teacher work. Writing and publishing of findings. Creation of support systems outside the school network. Mentoring of colleagues.
<b>Understanding of Multiliterate practices</b>	No understanding of the changing contexts of literacy – literacy as a social practice.	Literacy as social practice. Acknowledgement that literacy is learned through Primary and Secondary Discourses. There is valuing of student diversity at the individual level. There is inclusion of multimodal texts and some attention to the different semiotic systems they use.	Teachers conduct audits of students' literacy resources. Deficit notions inform teachers' understandings of students' capabilities. Greater access to and use of new forms of literacy (multimodal texts) in a range of contexts. Some explicit teaching in relation to the meaning-making of the various semiotic systems. Some awareness on the selection and manipulation of resources to convey meanings to influence the reader.	Valuing of the diversity of student's experiences and backgrounds at the collective level is evident in teaching. There is explicit teaching of semiotic systems of meaning making, using a metalanguage to describe. Greater attention to the selection and manipulation of content to influence the reader.	Teaching incorporates all aspects of multiliterate practices - Multimedia and ICTs, Semiotic systems, Critical literacy, and cultural and linguistic diversity. This is embedded in real life contexts using a range of authentic texts. Focus on literacy demands of curriculum areas.

However, *Multiliteracies* was almost invisible as a term in artifacts gathered at the whole school level. Multimedia and ICTs were used efficiently to communicate within the school setting on a daily basis for staff notices, but there was little evidence of other multiliterate practices enacted at the whole school level. In reality, there was still a strong emphasis on traditional print-based literacy and the improvement of student outcomes in both literacy and numeracy.

### **How are Teachers' Beliefs and Practices Shaped by the Implementation of Interactive Whiteboards at the Year Level?**

The whole-school level has provided the context in which teachers worked and structured their daily routines in relation to implementation of IWBs and the conceptualisation of Multiliteracies. The case selected for investigation was the Year 4 Professional Learning Team (actually comprised by three Year 4 teachers and one Year 3 teacher). Two teachers (PLT 1, PLT 2) had been *early adopters*; the other two (PLT 3, PLT 4) were in their first year as teachers and new to the school.

Teachers taught in two double teaching spaces, with the IWB located in the centre portion of the room. PLT 1 and PLT 4 shared one space; PLT 2 and PLT 3 were in the other. At times, paired teachers taught their respective classes separately, at other times they joined classes. With either pairing, teachers working collaboratively taught about 60 students in total.

Data gathered from the Year 4 Professional Learning Team involved interviews with teachers, and observations from term planning documents, field notes from planning meetings, informal conversations, classroom observations conducted during dedicated literacy blocks, a Multiliteracies Pedagogical Reflective Tool, and two instruments developed to assess students: the Home Literacies Survey and a Multiliteracies Assessment Tool.

All data sources, 68 in total, are sequenced in Table 5.3 to reflect the chronology of their origins in the school's project. Data from these sources track how the concept of Multiliteracies and associated teaching-learning practices were espoused and/or enacted by the Year 4 team. They contribute to an understanding of what counts as Multiliteracies in these classrooms. The date and type of data source are provided in the first and second columns. Columns three and four provide two analyses of data sources. In column three data are analysed for evidence of multiliterate practices as

discussed previously. Column four provides my comments on events in relation to Multiliteracies, and notations on the ways these represent espoused beliefs or enacted practice. As with whole school data, events or artefacts shaded in yellow signify critical events that shaped and influenced the social realities for this Professional Learning Team.

### ***Working with IWBs***

*Early adopters* were identified in Phase 1 as confident and enthusiastic users of IWBs. This was evident in teachers' comments about their experiences with and use of technology. One indicated that whilst she had a lot to learn in relation to technology, she was "in the kind of environment where that is easy to do, particularly with the people I work with, and our administration team at school, who value discovering new ways of teaching and learning using ICTs" (PLT 2: Interview). The other *early adopter* indicated mixed feelings when describing her experience with technology, in spite of having considerable exposure to IWBs. She described her relationship as:

Constantly changing. Times when I welcome it with confidence and excited anticipation while other times I find it quite frustrating as I feel I have never accomplished it all. I get a lot of satisfaction from seeing my students experiment with technologies and achieving great things. (PLT 1: Interview)

One of the novice teachers had been exposed to IWBs during practicum placement in the school in the previous year, indicated the need to learn more about technology and attributed her growth to her capacity as a quick learner (PLT 3: Interview). The other recent graduate revealed her struggle with wanting to use technology but having experienced problems with it in the past. She stated that, "It (technology) seems to fail me (issues – font changed, projector down, server down). I do want to use technology a lot in my classroom but I find myself ignoring it because I feel that it is too unreliable" (PLT 4). However, this view seems to have been countered somewhat by having an experienced user of IWBs as a teaching partner. She commented that:

Teaching at ... (school) and using the SmartBoard (as well as having a tech-freak as a teaching partner!) has made me see the value in technology as a teacher and learning tool, and I'm beginning to experiment with it more in the classroom. (PLT 4)



**Table 5.3 Table of Data Sources Year Level**

**Critical Events**

Date	Event	Multiliteracies (Cope & Kalantzis, 2000)				Comments
		Dimensions of Practice				
	<i>Data source:</i> FN = Field Notes A = Artefact TR=Teacher Reflection	M	SS	C/L	CL	
		M		div		MM = multimedia ICT= information communications technology SS = semiotic systems C/L Div = cultural/linguistic diversity CL = critical literacy
		&				
		ICT				
23/02/06	Planning Meeting (FN)	✓				<b>Espoused</b> – IWBs used for starting spelling activities. One teacher doesn't have IWB software at home to design or look at existing lessons. Grouping of Year 3 & 4's raises issues in relation to task completion. No teacher aides for literacy blocks.
23/02/06	Planning Document - Term 1 (A)	✓		✓	✓	<b>Espoused</b> –Australia in a Box integrated unit. Use of multimedia and ICTs. Cultural similarities and differences among Australian, Chinese, and Aboriginal and Torres Strait Islanders. Critical literacy – exploring stereotyping. No creative use of technology for presentation.
23/02/06	Initial Interview Janelle (A)	✓			✓	<b>Espoused</b> - Technology as central to learning and potential for student achievement., acknowledged that students should be critical users.
01/03/06	Note taking Lesson Janelle (FN)	✓				<b>Enacted</b> – Use of multimodal texts – Cut and pasted Internet text and photos into IWB software. Skimming/scanning based on keywords
02/03/06	Teacher Reflection (TR)	✓				<b>Espoused</b> - Appropriate skills for this type of text. Text too difficult for students.
9/03/06	Planning Meeting (FN)	✓	✓			<b>Espoused</b> – Mention of typing up good copy of sports profile – Form on computer for students to input text and photo.
13/03/06	Email – Teacher Reflection (TR)	✓				<b>Espoused</b> - Internet texts used live or cut and paste. “Internet texts really needs the reader to focus on the specific text, and not everything else on the page”
16/03/06	Sports Profile (FN)	✓				<b>Enacted</b> – Comparison of two webpages for same sportsperson. Credibility of websites briefly discussed
16/03/06	Teacher Reflection Sports Profile (A)	✓				<b>Espoused</b> – Using two different texts and discussing differences between credibility of sources. Texts targeted at higher level than perhaps Year 4. Choice of sportsperson – Australian, Aboriginal and female representative.
16/03/06	Planning Meeting (FN)	✓				<b>Espoused</b> – Title pages for student portfolios based on checklist. Discussion of tasks for Term 2- Photostory or interactive books suggested
21/03/06	Literacy block (FN)	✓				<b>Enacted</b> - Variety of texts used, including webpage, newspaper, and IWB. Teacher discusses differences between text types – factual. Teacher draws on students' prior knowledge.

21/03/06	Teacher Reflection Literacy block (A)	✓			<b>Esposued</b> - Internet site too hard for students. Lack of parental help related to lack of success of students.
25/03/06	Planning document Term 2 (A)	✓	✓		<b>Esposued</b> – Endangered Animals Integrated Unit – Multimedia presentation to persuade.
28/03/06	Planning Night ¾ (FN)	✓	✓		<b>Esposued</b> – Further discussion of culminating ICT task
30/03/06	Teacher Reflection ICT Pedagogical Licence	✓			<b>Esposued</b> – Discussed differences between ICT integration versus ICTs as integral to learning
05/04/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Easter activities – Computer activities - research, Internet Games
05/04/06	Literacy Block (TR) Janelle	✓			<b>Esposued</b> – Text editing game too challenging, Research activities too difficult
27/04/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Exploring Wetlands CD-Rom Integrated theme
03/05/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Navigate Intranet to locate Year 4 Webpage and link to South East Water , Water Cycle Learning Object. Playing game on the Wetlands CD-Rom.
04/05/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Small group of students playing learning object – Who’s for Dinner
11/05/06	Intel Master Trainer Professional Development – Teacher Reflection	✓			<b>Esposued</b> - Different viewpoints between this PD and ICT Pedagogical Licence in relation to notions of integration and ICTs as integral. Intel focuses on only using ICTs if they were the best tool. Limited software packages for demonstration of student outcomes – Publisher, Word, PowerPoint. Exemplary practices have moved beyond these programs alone.
17/05/06	Literacy block (FN) Janelle	✓			<b>Enacted</b> – Night of the Bilby Learning Object. Teacher directed activity first. Focus questions to questions related to content of game. Computer Activity – Compare/Contrast Rainforest/Desert Environments. Students found it difficult to locate information to complete questions.
17/05/06	Teacher Reflection Literacy Block (A) Janelle	✓	✓		<b>Esposued</b> – Learning Objects offer different modes of communication –visual, written, sound.
18/05/06	Email (TR)	✓			<b>Esposued</b> - Difficulty of previous compare/contrast task related to inability of most students to compare
18/05/06	Initial Interview Jessica (A) Sally	✓	✓	✓	<b>Esposued</b> – Different forms of literacy, acknowledged visual literacy required for TV, movies, computer and IWB. Students need to comprehend the different messages that different forms of literacy give
25/05/06	Story innovation (FN)	✓	✓		<b>Enacted</b> – Digital Storybook. Uses of modes of written and visual codes for student engagement.
25/05/06	Teacher Reflections Story Innovation (A)	✓	✓	✓	<b>Esposued</b> - IWB engaging, modes catering to learning styles of students
25/05/06	Literacy Block (FN) Brianna/Jessica	✓	✓		<b>Enacted</b> - PowerPoint lesson – adding text, graphics, animations
01/06/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> - Commonly misused words – IWB activity
11/06/06	Teacher Reflection Multiliteracies (A) - Janelle	✓		✓	<b>Esposued</b> - Does not explore critical aspects in regards to audience, perspective, purpose and context. All classroom examples in relation to print-based notions (sentences, conjunctions, etc). Endeavours to cater to student diversity. Notions of student deficit evident in comments.
12/06/06	Multiliteracies Reflective Tool Janelle (A)	✓		✓	<b>Esposued</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Email re Multiliteracies Reflective tool (Janelle) (A)	✓			<b>Esposued</b> – “so much focus is on basic literacy skills at this school”

12/06/06	Multiliteracies Reflective Tool Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Jessica (A)	✓		✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Dee (A)	✓		✓		<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
14/06/06	Learning Object Lesson (FN)	✓				<b>Enacted</b> - Picture this Learning Object – Impetus from previous structured reflection
14/06/06	Learning Object Teacher Reflection (A)	✓		✓		<b>Espoused</b> – Engaging multimodal, non-linear Learning Object. “Couldn’t think of a better way to do an activity like this”
15/06/06	Literacy Block (FN) Sarah	✓				<b>Enacted</b> - Spelling Activities on IWB
15/06/06	Literacy Block (FN) Brianna/Jessica	✓				<b>Enacted</b> - Students playing game on IWB
18/06/06	Initial Interview Dee (A)	✓				<b>Espoused</b> – In past linked to technology. Broad notion
21/06/06	Email Brianna re Multiliteracies Reflective Tool (A)	✓				<b>Espoused</b> – Need more information on intertextuality, semiotic systems and critical literacy.
21/06/06	Email Response Brianna re literacy block considerations (A)	✓				<b>Espoused</b> –Who’s for Dinner- group task promoted discussion – task probably lent itself to independent work.
21/06/06	Initial Interview Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Multiliteracies very broad. Referred to Literate Futures (2001) for definition and provided their definition.
4/07/06	Email from Janelle re PD needed for Multiliteracies (A)					<b>Espoused</b> – Need practical ways for incorporating Multiliteracies into classroom practice
17/07/06	Literacy Block (FN) Dee/ Sarah	✓				<b>Enacted</b> -Procedural Text – Fruit Salad
17/07/06	Teacher Reflection	✓	✓			<b>Espoused</b> – Fruit Salad Text, some text, but plenty of picture supports for more visual learners
20/07/06	Literacy Block (FN) Sally/Fiona	✓				<b>Enacted</b> -Maggies Earth Adventures, Small group, Parts of Speech – Games on IWB
20/07/06	Planning Meeting (FN/A)	✓	✓	✓		<b>Espoused</b> – Audit of student home literacy practices, focus on visual codes and Multiliteracies for term planning documents
24/07/06	Email Teacher Reflection	✓			✓	<b>Espoused</b> – IWB is used for whole group explicit teaching as well as small group activities. Texts used link to student’ secondary discourses. Critical literacy activities – Just Kidding Magazine
24/07/06	Teacher Journal Reflection	✓			✓	<b>Espoused</b> – IWB and computer activities not always the same, vary according to the ability of the group of students. Example of critical literacy activity – Just Kidding Magazine.
27/07/06	Literacy Block (FN) Jessica Sally	✓				<b>Enacted</b> -Editing Task – Edit Dan’s Copy, Writing Hour- Procedural Text Fruit salad Activity
27/07/06	Teacher Reflection (FN)	✓				<b>Espoused</b> – During fruit salad activity not all students engaged. Glare on IWB makes it hard for some students to see.
3/08/06	Planning Meeting (FN)	✓		✓		<b>Espoused</b> – Discussed Home Literacy Survey (use of student portfolios), Professional readings on Multiliteracies and Assessment for multimodal texts
11/08/06	Reflection by Janelle on Multiliteracies Assessment (A)	✓				<b>Espoused</b> – Need to incorporate more of a critical literacy aspect. IWB perfect for this due to collaboration and social learning process that would aid students with these skills.

14/08/06	Email Janelle re Multiliteracies Assess Yr 4 (A)	✓	✓		<b>Esposued</b> – Does not discuss type of book, audience etc in relation to online resources. Hasn't acknowledged online resources as a type of literacy.
18/08/06	Literacy Block (FN)				<b>Enacted</b> Watching Skipping DVD. Instruction genre for a skipping skill.
19/08/06	Reflection on Multiliteracies Assess Jessica Yr 4 (A)	✓			<b>Esposued</b> – Students struggled with Text User role. Unaware that she wasn't teaching this. Focuses more on critical literacy. Surprising results for one student – ESL, Learning support and no computer at home.
24/08/06	Literacy Block (FN) Bianca Fiona	✓	✓		<b>Enacted</b> – Making a photograph. Technical codes of photos – angle, lighting. Reflection at the end of the Literacy block – Photographs- what makes a good photograph
24/08/06	Planning Meeting (FN)	✓			<b>Esposued</b> – Unit Plan for Term 4 Charlie and the Chocolate Factory. Intel Unit
31/08/06	Literacy Block (FN)	✓	✓		<b>Enacted</b> – Students creating PowerPoint.
04/09/06	Literacy Block (FN)	✓			<b>Enacted</b> - Children typing up instructions in <b>Commenting</b>
07/09/06	Literacy Block (FN)				<b>Enacted</b> - Sally Fiona – students taking digital photos for task
13/09/06	Planning Meeting (FN) <i>FN = Field Notes</i>	✓			<b>Esposued</b> - Unit Planning continued, Problems with digital cameras – take only 8 photos and need to be recharged constantly
20/10/06	Planning Document - Term 4 (A)				<b>Esposued</b> - Multimedia ICTs in Operation Factory. Booklets DVD explored.
25/10/06	Planning Meeting (FN)				<b>Esposued</b> - No computer to do, no computer labs, trouble with getting tasks completed
25/10/06	Multiliteracies Assessment Dee (A)	✓			<b>Esposued</b> – Text User an area of need. Students who got highest marks were surprising as they were ESL and lower readers.
02/11/06	Planning Meeting (FN)	✓			<b>Esposued</b> - Web class Writing stories using Pyramid. One teacher doesn't have IWB software at home
09/11/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> - Compare/Contrast the person in Charlie and the Chocolate Factory. Comparison task DVD/book. No teacher aides for literacy blocks.
23/02/06	Planning Document - Term 1 (A)	✓	✓	✓	<b>Esposued</b> – Australia in a Box integrated unit. Use of multimedia and ICTs. Cultural similarities and differences among Australian, Chinese, and Aboriginal and Torres Strait Islanders. Critical literacy – exploring stereotyping. No creative use of technology for presentation.
23/02/06	Initial Interview Janelle (A)	✓		✓	<b>Esposued</b> - Technology as central to learning and potential for student achievement., acknowledged that students should be critical users.
01/03/06	Note taking Lesson Janelle (FN)	✓			<b>Enacted</b> – Use of multimodal texts – Cut and pasted Internet text and photos into IWB software. Skimming/scanning based on keywords
02/03/06	Teacher Reflection (TR)	✓			<b>Esposued</b> - Appropriate skills for this type of text. Text too difficult for students.
9/03/06	Planning Meeting (FN)	✓	✓		<b>Esposued</b> – Mention of typing up good copy of sports profile – Form on computer for students to input text and photo.
13/03/06	Email – Teacher Reflection (TR)	✓			<b>Esposued</b> - Internet texts used live or cut and paste. “Internet texts really needs the reader to focus on the specific text, and not everything else on the page”
16/03/06	Sports Profile (FN)	✓			<b>Enacted</b> – Comparison of two webpages for same sportsperson. Credibility of websites briefly discussed
16/03/06	Teacher Reflection Sports Profile (A)	✓			<b>Esposued</b> – Using two different texts and discussing differences between credibility of sources. Texts targeted at higher level than perhaps Year 4. Choice of sportsperson – Australian, Aboriginal and female representative.
16/03/06	Planning Meeting (FN)	✓			<b>Esposued</b> – Title pages for student portfolios based on checklist. Discussion of tasks for Term 2- Photostory or interactive books suggested
21/03/06	Literacy block (FN)	✓			<b>Enacted</b> - Variety of texts used, including webpage, newspaper, and IWB. Teacher discusses differences between text types – factual. Teacher draws on students' prior knowledge.

21/03/06	Teacher Reflection Literacy block (A)	✓			<b>Esposued</b> - Internet site too hard for students. Lack of parental help related to lack of success of students.
25/03/06	Planning document Term 2 (A)	✓	✓		<b>Esposued</b> – Endangered Animals Integrated Unit – Multimedia presentation to persuade.
28/03/06	Planning Night ¾ (FN)	✓	✓		<b>Esposued</b> – Further discussion of culminating ICT task
30/03/06	Teacher Reflection ICT Pedagogical Licence	✓			<b>Esposued</b> – Discussed differences between ICT integration versus ICTs as integral to learning
05/04/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Easter activities – Computer activities - research, Internet Games
05/04/06	Literacy Block (TR) Janelle	✓			<b>Esposued</b> – Text editing game too challenging, Research activities too difficult
27/04/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Exploring Wetlands CD-Rom Integrated theme
03/05/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Navigate Intranet to locate Year 4 Webpage and link to South East Water , Water Cycle Learning Object. Playing game on the Wetlands CD-Rom.
04/05/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Small group of students playing learning object – Who’s for Dinner
11/05/06	Intel Master Trainer Professional Development – Teacher Reflection	✓			<b>Esposued</b> - Different viewpoints between this PD and ICT Pedagogical Licence in relation to notions of integration and ICTs as integral. Intel focuses on only using ICTs if they were the best tool. Limited software packages for demonstration of student outcomes – Publisher, Word, PowerPoint. Exemplary practices have moved beyond these programs alone.
17/05/06	Literacy block (FN) Janelle	✓			<b>Enacted</b> – Night of the Bilby Learning Object. Teacher directed activity first. Focus questions to questions related to content of game. Computer Activity – Compare/Contrast Rainforest/Desert Environments. Students found it difficult to locate information to complete questions.
17/05/06	Teacher Reflection Literacy Block (A) Janelle	✓	✓		<b>Esposued</b> – Learning Objects offer different modes of communication –visual, written, sound.
18/05/06	Email (TR)	✓			<b>Esposued</b> - Difficulty of previous compare/contrast task related to inability of most students to compare
18/05/06	Initial Interview Jessica (A) Sally	✓	✓	✓	<b>Esposued</b> – Different forms of literacy, acknowledged visual literacy required for TV, movies, computer and IWB. Students need to comprehend the different messages that different forms of literacy give
25/05/06	Story innovation (FN)	✓	✓		<b>Enacted</b> – Digital Storybook. Uses of modes of written and visual codes for student engagement.
25/05/06	Teacher Reflections Story Innovation (A)	✓	✓	✓	<b>Esposued</b> - IWB engaging, modes catering to learning styles of students
25/05/06	Literacy Block (FN) Brianna/Jessica	✓	✓		<b>Enacted</b> - PowerPoint lesson – adding text, graphics, animations
01/06/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> - Commonly misused words – IWB activity
11/06/06	Teacher Reflection Multiliteracies (A) - Janelle	✓		✓	<b>Esposued</b> - Does not explore critical aspects in regards to audience, perspective, purpose and context. All classroom examples in relation to print-based notions (sentences, conjunctions, etc). Endeavours to cater to student diversity. Notions of student deficit evident in comments.
12/06/06	Multiliteracies Reflective Tool Janelle (A)	✓		✓	<b>Esposued</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Email re Multiliteracies Reflective tool (Janelle) (A)	✓			<b>Esposued</b> – “so much focus is on basic literacy skills at this school”

12/06/06	Multiliteracies Reflective Tool Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Jessica (A)	✓		✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Dee (A)	✓		✓		<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
14/06/06	Learning Object Lesson (FN)	✓				<b>Enacted</b> - Picture this Learning Object – Impetus from previous structured reflection
14/06/06	Learning Object Teacher Reflection (A)	✓		✓		<b>Espoused</b> – Engaging multimodal, non-linear Learning Object. “Couldn’t think of a better way to do an activity like this”
15/06/06	Literacy Block (FN) Sarah	✓				<b>Enacted</b> - Spelling Activities on IWB
15/06/06	Literacy Block (FN) Brianna/Jessica	✓				<b>Enacted</b> - Students playing game on IWB
18/06/06	Initial Interview Dee (A)	✓				<b>Espoused</b> – In past linked to technology. Broad notion
21/06/06	Email Brianna re Multiliteracies Reflective Tool (A)	✓				<b>Espoused</b> – Need more information on intertextuality, semiotic systems and critical literacy.
21/06/06	Email Response Brianna re literacy block considerations (A)	✓				<b>Espoused</b> –Who’s for Dinner- group task promoted discussion – task probably lent itself to independent work.
21/06/06	Initial Interview Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Multiliteracies very broad. Referred to Literate Futures (2001) for definition and provided their definition.
4/07/06	Email from Janelle re PD needed for Multiliteracies (A)					<b>Espoused</b> – Need practical ways for incorporating Multiliteracies into classroom practice
17/07/06	Literacy Block (FN) Dee/ Sarah	✓				<b>Enacted</b> -Procedural Text – Fruit Salad
17/07/06	Teacher Reflection	✓	✓			<b>Espoused</b> – Fruit Salad Text, some text, but plenty of picture supports for more visual learners
20/07/06	Literacy Block (FN) Sally/Fiona	✓				<b>Enacted</b> -Maggies Earth Adventures, Small group, Parts of Speech – Games on IWB
20/07/06	Planning Meeting (FN/A)	✓	✓	✓		<b>Espoused</b> – Audit of student home literacy practices, focus on visual codes and Multiliteracies for term planning documents
24/07/06	Email Teacher Reflection	✓			✓	<b>Espoused</b> – IWB is used for whole group explicit teaching as well as small group activities. Texts used link to student’ secondary discourses. Critical literacy activities – Just Kidding Magazine
24/07/06	Teacher Journal Reflection	✓			✓	<b>Espoused</b> – IWB and computer activities not always the same, vary according to the ability of the group of students. Example of critical literacy activity – Just Kidding Magazine.
27/07/06	Literacy Block (FN) Jessica Sally	✓				<b>Enacted</b> -Editing Task – Edit Dan’s Copy, Writing Hour- Procedural Text Fruit salad Activity
27/07/06	Teacher Reflection (FN)	✓				<b>Espoused</b> – During fruit salad activity not all students engaged. Glare on IWB makes it hard for some students to see.
3/08/06	Planning Meeting (FN)	✓		✓		<b>Espoused</b> – Discussed Home Literacy Survey (use of student portfolios), Professional readings on Multiliteracies and Assessment for multimodal texts
11/08/06	Reflection by Janelle on Multiliteracies Assessment (A)	✓				<b>Espoused</b> – Need to incorporate more of a critical literacy aspect. IWB perfect for this due to collaboration and social learning process that would aid students with these skills.

14/08/06	Email Janelle re Multiliteracies Assess Yr 4 (A)	✓	✓		<b>Esposued</b> – Does not discuss type of book, audience etc in relation to online resources. Hasn't acknowledged online resources as a type of literacy.
18/08/06	Literacy Block (FN)				<b>Enacted</b> Watching Skipping DVD. Instruction genre for a skipping skill.
19/08/06	Reflection on Multiliteracies Assess Jessica Yr 4 (A)	✓			<b>Esposued</b> – Students struggled with Text User role. Unaware that she wasn't teaching this. Focuses more on critical literacy. Surprising results for one student – ESL, Learning support and no computer at home.
24/08/06	Literacy Block (FN) Bianca Fiona	✓	✓		<b>Enacted</b> – Making a photograph. Technical codes of photos – angle, lighting. Reflection at the end of the Literacy block – Photographs- what makes a good photograph
24/08/06	Planning Meeting (FN)	✓			<b>Esposued</b> – Unit Plan for Term 4 Charlie and the Chocolate Factory. Intel Unit
31/08/06	Literacy Block (FN)	✓	✓		<b>Enacted</b> – Students creating PowerPoint.
04/09/06	Literacy Block (FN)	✓			<b>Enacted</b> - Children typing up instructions in <b>Commenting</b>
07/09/06	Literacy Block (FN)				<b>Enacted</b> - Sally Fiona – students taking digital photos for task
13/09/06	Planning Meeting (FN) <i>FN = Field Notes</i>	✓			<b>Esposued</b> - Unit Planning continued, Problems with digital cameras – take only 8 photos and need to be recharged constantly
20/10/06	Planning Document - Term 4 (A)				<b>Esposued</b> - Multimedia ICTs in Operation Factory. Booklets DVD explored.
25/10/06	Planning Meeting (FN)				<b>Esposued</b> - No computer to do, no computer labs, trouble with getting tasks completed
25/10/06	Multiliteracies Assessment Dee (A)	✓			<b>Esposued</b> – Text User an area of need. Students who got highest marks were surprising as they were ESL and lower readers.
02/11/06	Planning Meeting (FN)	✓			<b>Esposued</b> - Web class Writing stories using Pyramid. One teacher doesn't have IWB software at home
09/11/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> - Compare/Contrast the person in Charlie and the Chocolate Factory. Comparison task DVD/book. No teacher aides for literacy blocks.
23/02/06	Planning Document - Term 1 (A)	✓	✓	✓	<b>Esposued</b> – Australia in a Box integrated unit. Use of multimedia and ICTs. Cultural similarities and differences among Australian, Chinese, and Aboriginal and Torres Strait Islanders. Critical literacy – exploring stereotyping. No creative use of technology for presentation.
23/02/06	Initial Interview Janelle (A)	✓		✓	<b>Esposued</b> - Technology as central to learning and potential for student achievement., acknowledged that students should be critical users.
01/03/06	Note taking Lesson Janelle (FN)	✓			<b>Enacted</b> – Use of multimodal texts – Cut and pasted Internet text and photos into IWB software. Skimming/scanning based on keywords
02/03/06	Teacher Reflection (TR)	✓			<b>Esposued</b> - Appropriate skills for this type of text. Text too difficult for students.
9/03/06	Planning Meeting (FN)	✓	✓		<b>Esposued</b> – Mention of typing up good copy of sports profile – Form on computer for students to input text and photo.
13/03/06	Email – Teacher Reflection (TR)	✓			<b>Esposued</b> - Internet texts used live or cut and paste. “Internet texts really needs the reader to focus on the specific text, and not everything else on the page”
16/03/06	Sports Profile (FN)	✓			<b>Enacted</b> – Comparison of two webpages for same sportsperson. Credibility of websites briefly discussed
16/03/06	Teacher Reflection Sports Profile (A)	✓			<b>Esposued</b> – Using two different texts and discussing differences between credibility of sources. Texts targeted at higher level than perhaps Year 4. Choice of sportsperson – Australian, Aboriginal and female representative.
16/03/06	Planning Meeting (FN)	✓			<b>Esposued</b> – Title pages for student portfolios based on checklist. Discussion of tasks for Term 2- Photostory or interactive books suggested
21/03/06	Literacy block (FN)	✓			<b>Enacted</b> - Variety of texts used, including webpage, newspaper, and IWB. Teacher discusses differences between text types – factual. Teacher draws on students' prior knowledge.

21/03/06	Teacher Reflection Literacy block (A)	✓			<b>Esposued</b> - Internet site too hard for students. Lack of parental help related to lack of success of students.
25/03/06	Planning document Term 2 (A)	✓	✓		<b>Esposued</b> – Endangered Animals Integrated Unit – Multimedia presentation to persuade.
28/03/06	Planning Night ¾ (FN)	✓	✓		<b>Esposued</b> – Further discussion of culminating ICT task
30/03/06	Teacher Reflection ICT Pedagogical Licence	✓			<b>Esposued</b> – Discussed differences between ICT integration versus ICTs as integral to learning
05/04/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Easter activities – Computer activities - research, Internet Games
05/04/06	Literacy Block (TR) Janelle	✓			<b>Esposued</b> – Text editing game too challenging, Research activities too difficult
27/04/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Exploring Wetlands CD-Rom Integrated theme
03/05/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Navigate Intranet to locate Year 4 Webpage and link to South East Water , Water Cycle Learning Object. Playing game on the Wetlands CD-Rom.
04/05/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Small group of students playing learning object – Who’s for Dinner
11/05/06	Intel Master Trainer Professional Development – Teacher Reflection	✓			<b>Esposued</b> - Different viewpoints between this PD and ICT Pedagogical Licence in relation to notions of integration and ICTs as integral. Intel focuses on only using ICTs if they were the best tool. Limited software packages for demonstration of student outcomes – Publisher, Word, PowerPoint. Exemplary practices have moved beyond these programs alone.
17/05/06	Literacy block (FN) Janelle	✓			<b>Enacted</b> – Night of the Bilby Learning Object. Teacher directed activity first. Focus questions to questions related to content of game. Computer Activity – Compare/Contrast Rainforest/Desert Environments. Students found it difficult to locate information to complete questions.
17/05/06	Teacher Reflection Literacy Block (A) Janelle	✓	✓		<b>Esposued</b> – Learning Objects offer different modes of communication –visual, written, sound.
18/05/06	Email (TR)	✓			<b>Esposued</b> - Difficulty of previous compare/contrast task related to inability of most students to compare
18/05/06	Initial Interview Jessica (A) Sally	✓	✓	✓	<b>Esposued</b> – Different forms of literacy, acknowledged visual literacy required for TV, movies, computer and IWB. Students need to comprehend the different messages that different forms of literacy give
25/05/06	Story innovation (FN)	✓	✓		<b>Enacted</b> – Digital Storybook. Uses of modes of written and visual codes for student engagement.
25/05/06	Teacher Reflections Story Innovation (A)	✓	✓	✓	<b>Esposued</b> - IWB engaging, modes catering to learning styles of students
25/05/06	Literacy Block (FN) Brianna/Jessica	✓	✓		<b>Enacted</b> - PowerPoint lesson – adding text, graphics, animations
01/06/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> - Commonly misused words – IWB activity
11/06/06	Teacher Reflection Multiliteracies (A) - Janelle	✓		✓	<b>Esposued</b> - Does not explore critical aspects in regards to audience, perspective, purpose and context. All classroom examples in relation to print-based notions (sentences, conjunctions, etc). Endeavours to cater to student diversity. Notions of student deficit evident in comments.
12/06/06	Multiliteracies Reflective Tool Janelle (A)	✓		✓	<b>Esposued</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Email re Multiliteracies Reflective tool (Janelle) (A)	✓			<b>Esposued</b> – “so much focus is on basic literacy skills at this school”



12/06/06	Multiliteracies Reflective Tool Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Jessica (A)	✓		✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Dee (A)	✓		✓		<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
14/06/06	Learning Object Lesson (FN)	✓				<b>Enacted</b> - Picture this Learning Object – Impetus from previous structured reflection
14/06/06	Learning Object Teacher Reflection (A)	✓		✓		<b>Espoused</b> – Engaging multimodal, non-linear Learning Object. “Couldn’t think of a better way to do an activity like this”
15/06/06	Literacy Block (FN) Sarah	✓				<b>Enacted</b> - Spelling Activities on IWB
15/06/06	Literacy Block (FN) Brianna/Jessica	✓				<b>Enacted</b> - Students playing game on IWB
18/06/06	Initial Interview Dee (A)	✓				<b>Espoused</b> – In past linked to technology. Broad notion
21/06/06	Email Brianna re Multiliteracies Reflective Tool (A)	✓				<b>Espoused</b> – Need more information on intertextuality, semiotic systems and critical literacy.
21/06/06	Email Response Brianna re literacy block considerations (A)	✓				<b>Espoused</b> –Who’s for Dinner- group task promoted discussion – task probably lent itself to independent work.
21/06/06	Initial Interview Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Multiliteracies very broad. Referred to Literate Futures (2001) for definition and provided their definition.
4/07/06	Email from Janelle re PD needed for Multiliteracies (A)					<b>Espoused</b> – Need practical ways for incorporating Multiliteracies into classroom practice
17/07/06	Literacy Block (FN) Dee/ Sarah	✓				<b>Enacted</b> -Procedural Text – Fruit Salad
17/07/06	Teacher Reflection	✓	✓			<b>Espoused</b> – Fruit Salad Text, some text, but plenty of picture supports for more visual learners
20/07/06	Literacy Block (FN) Sally/Fiona	✓				<b>Enacted</b> -Maggies Earth Adventures, Small group, Parts of Speech – Games on IWB
20/07/06	Planning Meeting (FN/A)	✓	✓	✓		<b>Espoused</b> – Audit of student home literacy practices, focus on visual codes and Multiliteracies for term planning documents
24/07/06	Email Teacher Reflection	✓			✓	<b>Espoused</b> – IWB is used for whole group explicit teaching as well as small group activities. Texts used link to student’ secondary discourses. Critical literacy activities – Just Kidding Magazine
24/07/06	Teacher Journal Reflection	✓			✓	<b>Espoused</b> – IWB and computer activities not always the same, vary according to the ability of the group of students. Example of critical literacy activity – Just Kidding Magazine.
27/07/06	Literacy Block (FN) Jessica Sally	✓				<b>Enacted</b> -Editing Task – Edit Dan’s Copy, Writing Hour- Procedural Text Fruit salad Activity
27/07/06	Teacher Reflection (FN)	✓				<b>Espoused</b> – During fruit salad activity not all students engaged. Glare on IWB makes it hard for some students to see.
3/08/06	Planning Meeting (FN)	✓		✓		<b>Espoused</b> – Discussed Home Literacy Survey (use of student portfolios), Professional readings on Multiliteracies and Assessment for multimodal texts
11/08/06	Reflection by Janelle on Multiliteracies Assessment (A)	✓				<b>Espoused</b> – Need to incorporate more of a critical literacy aspect. IWB perfect for this due to collaboration and social learning process that would aid students with these skills.

14/08/06	Email Janelle re Multiliteracies Assess Yr 4 (A)	✓		✓	<b>Esposued</b> – Does not discuss type of book, audience etc in relation to online resources. Hasn't acknowledged online resources as a type of literacy.
18/08/06	Literacy Block (FN)				<b>Enacted</b> Watching Skipping DVD. Instruction genre for a skipping skill.
19/08/06	Reflection on Multiliteracies Assess Jessica Yr 4 (A)	✓			<b>Esposued</b> – Students struggled with Text User role. Unaware that she wasn't teaching this. Focuses more on critical literacy. Surprising results for one student – ESL, Learning support and no computer at home.
24/08/06	Literacy Block (FN) Bianca Fiona	✓	✓		<b>Enacted</b> – Making a photograph. Technical codes of photos – angle, lighting. Reflection at the end of the Literacy block – Photographs- what makes a good photograph
24/08/06	Planning Meeting (FN)	✓			<b>Esposued</b> – Unit Plan for Term 4 Charlie and the Chocolate Factory. Intel Unit
31/08/06	Literacy Block (FN)	✓	✓		<b>Enacted</b> – Students creating PowerPoint.
<b>Date</b>	<b>Event</b>	<b>Multiliteracies (Cope &amp; Kalantzis, 2000)</b>			<b>Comments</b>
	<i>Data source: FN = Field Notes A = Artefact TR=Teacher Reflection</i>	<b>Dimensions of Practice</b>			
		<b>M</b>	<b>SS</b>	<b>C/L</b>	<b>CL</b>
		<b>M</b>		<b>div</b>	
		<b>&amp;</b>			
		<b>ICT</b>			
					<b>MM = multimedia ICT= information communications technology</b>
					<b>SS = semiotic systems</b>
					<b>C/L Div = cultural/linguistic diversity</b>
					<b>CL = critical literacy</b>
02/02/06	Planning Meeting (FN)	✓			<b>Esposued</b> – IWB class for writing stories. Story Pyramid. One teacher doesn't have IWB software at home.
09/11/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> de Gennep (Contact the person in Guang and the Chocolate Factory). Comparison task DVD/book. No teacher aides for literacy blocks.
23/02/06	Planning Document - Term 1 (A)	✓		✓	<b>Esposued</b> – Australia in a Box integrated unit. Use of multimedia and ICTs. Cultural similarities and differences among Australian, Chinese, and Aboriginal and Torres Strait Islanders. Critical literacy – exploring stereotyping. No creative use of technology for presentation.
23/02/06	Initial Interview Janelle (A)	✓		✓	<b>Esposued</b> - Technology as central to learning and potential for student achievement., acknowledged that students should be critical users.
01/03/06	Note taking Lesson Janelle (FN)	✓			<b>Enacted</b> – Use of multimodal texts – Cut and pasted Internet text and photos into IWB software. Skimming/scanning based on keywords
02/03/06	Teacher Reflection (TR)	✓			<b>Esposued</b> - Appropriate skills for this type of text. Text too difficult for students.
9/03/06	Planning Meeting (FN)	✓	✓		<b>Esposued</b> – Mention of typing up good copy of sports profile – Form on computer for students to input text and photo.
13/03/06	Email – Teacher Reflection (TR)	✓			<b>Esposued</b> - Internet texts used live or cut and paste. “Internet texts really needs the reader to focus on the specific text, and not everything else on the page”
16/03/06	Sports Profile (FN)	✓			<b>Enacted</b> – Comparison of two webpages for same sportsperson. Credibility of websites briefly discussed
16/03/06	Teacher Reflection Sports Profile (A)	✓			<b>Esposued</b> – Using two different texts and discussing differences between credibility of sources. Texts targeted at higher level than perhaps Year 4. Choice of sportsperson – Australian, Aboriginal and female representative.
16/03/06	Planning Meeting (FN)	✓			<b>Esposued</b> – Title pages for student portfolios based on checklist. Discussion of tasks for Term 2- Photostory or interactive books suggested
21/03/06	Literacy block (FN)	✓			<b>Enacted</b> - Variety of texts used, including webpage, newspaper, and IWB. Teacher discusses differences between text types – factual. Teacher draws on students' prior knowledge.

21/03/06	Teacher Reflection Literacy block (A)	✓			<b>Esposued</b> - Internet site too hard for students. Lack of parental help related to lack of success of students.
25/03/06	Planning document Term 2 (A)	✓	✓		<b>Esposued</b> – Endangered Animals Integrated Unit – Multimedia presentation to persuade.
28/03/06	Planning Night ¾ (FN)	✓	✓		<b>Esposued</b> – Further discussion of culminating ICT task
30/03/06	Teacher Reflection ICT Pedagogical Licence	✓			<b>Esposued</b> – Discussed differences between ICT integration versus ICTs as integral to learning
05/04/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Easter activities – Computer activities - research, Internet Games
05/04/06	Literacy Block (TR) Janelle	✓			<b>Esposued</b> – Text editing game too challenging, Research activities too difficult
27/04/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Exploring Wetlands CD-Rom Integrated theme
03/05/06	Literacy Block (FN) Janelle/Sarah	✓			<b>Enacted</b> – Navigate Intranet to locate Year 4 Webpage and link to South East Water , Water Cycle Learning Object. Playing game on the Wetlands CD-Rom.
04/05/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> -Small group of students playing learning object – Who’s for Dinner
11/05/06	Intel Master Trainer Professional Development – Teacher Reflection	✓			<b>Esposued</b> - Different viewpoints between this PD and ICT Pedagogical Licence in relation to notions of integration and ICTs as integral. Intel focuses on only using ICTs if they were the best tool. Limited software packages for demonstration of student outcomes – Publisher, Word, PowerPoint. Exemplary practices have moved beyond these programs alone.
17/05/06	Literacy block (FN) Janelle	✓			<b>Enacted</b> – Night of the Bilby Learning Object. Teacher directed activity first. Focus questions to questions related to content of game. Computer Activity – Compare/Contrast Rainforest/Desert Environments. Students found it difficult to locate information to complete questions.
17/05/06	Teacher Reflection Literacy Block (A) Janelle	✓	✓		<b>Esposued</b> – Learning Objects offer different modes of communication –visual, written, sound.
18/05/06	Email (TR)	✓			<b>Esposued</b> - Difficulty of previous compare/contrast task related to inability of most students to compare
18/05/06	Initial Interview Jessica (A) Sally	✓	✓	✓	<b>Esposued</b> – Different forms of literacy, acknowledged visual literacy required for TV, movies, computer and IWB. Students need to comprehend the different messages that different forms of literacy give
25/05/06	Story innovation (FN)	✓	✓		<b>Enacted</b> – Digital Storybook. Uses of modes of written and visual codes for student engagement.
25/05/06	Teacher Reflections Story Innovation (A)	✓	✓	✓	<b>Esposued</b> - IWB engaging, modes catering to learning styles of students
25/05/06	Literacy Block (FN) Brianna/Jessica	✓	✓		<b>Enacted</b> - PowerPoint lesson – adding text, graphics, animations
01/06/06	Literacy Block (FN) Brianna/Jessica	✓			<b>Enacted</b> - Commonly misused words – IWB activity
11/06/06	Teacher Reflection Multiliteracies (A) - Janelle	✓		✓	<b>Esposued</b> - Does not explore critical aspects in regards to audience, perspective, purpose and context. All classroom examples in relation to print-based notions (sentences, conjunctions, etc). Endeavours to cater to student diversity. Notions of student deficit evident in comments.
12/06/06	Multiliteracies Reflective Tool Janelle (A)	✓		✓	<b>Esposued</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Email re Multiliteracies Reflective tool (Janelle) (A)	✓			<b>Esposued</b> – “so much focus is on basic literacy skills at this school”

12/06/06	Multiliteracies Reflective Tool Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Jessica (A)	✓		✓	✓	<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Multiliteracies Reflective Tool Dee (A)	✓		✓		<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
14/06/06	Learning Object Lesson (FN)	✓				<b>Enacted</b> - Picture this Learning Object – Impetus from previous structured reflection
14/06/06	Learning Object Teacher Reflection (A)	✓		✓		<b>Espoused</b> – Engaging multimodal, non-linear Learning Object. “Couldn’t think of a better way to do an activity like this”
15/06/06	Literacy Block (FN) Sarah	✓				<b>Enacted</b> - Spelling Activities on IWB
15/06/06	Literacy Block (FN) Brianna/Jessica	✓				<b>Enacted</b> - Students playing game on IWB
18/06/06	Initial Interview Dee (A)	✓				<b>Espoused</b> – In past linked to technology. Broad notion
21/06/06	Email Brianna re Multiliteracies Reflective Tool (A)	✓				<b>Espoused</b> – Need more information on intertextuality, semiotic systems and critical literacy.
21/06/06	Email Response Brianna re literacy block considerations (A)	✓				<b>Espoused</b> –Who’s for Dinner- group task promoted discussion – task probably lent itself to independent work.
21/06/06	Initial Interview Brianna (A)	✓	✓	✓	✓	<b>Espoused</b> – Multiliteracies very broad. Referred to Literate Futures (2001) for definition and provided their definition.
4/07/06	Email from Janelle re PD needed for Multiliteracies (A)					<b>Espoused</b> – Need practical ways for incorporating Multiliteracies into classroom practice
17/07/06	Literacy Block (FN) Dee/ Sarah	✓				<b>Enacted</b> -Procedural Text – Fruit Salad
17/07/06	Teacher Reflection	✓	✓			<b>Espoused</b> – Fruit Salad Text, some text, but plenty of picture supports for more visual learners
20/07/06	Literacy Block (FN) Sally/Fiona	✓				<b>Enacted</b> -Maggies Earth Adventures, Small group, Parts of Speech – Games on IWB
20/07/06	Planning Meeting (FN/A)	✓	✓	✓		<b>Espoused</b> – Audit of student home literacy practices, focus on visual codes and Multiliteracies for term planning documents
24/07/06	Email Teacher Reflection	✓			✓	<b>Espoused</b> – IWB is used for whole group explicit teaching as well as small group activities. Texts used link to student’ secondary discourses. Critical literacy activities – Just Kidding Magazine
24/07/06	Teacher Journal Reflection	✓			✓	<b>Espoused</b> – IWB and computer activities not always the same, vary according to the ability of the group of students. Example of critical literacy activity – Just Kidding Magazine.
27/07/06	Literacy Block (FN) Jessica Sally	✓				<b>Enacted</b> -Editing Task – Edit Dan’s Copy, Writing Hour- Procedural Text Fruit salad Activity
27/07/06	Teacher Reflection (FN)	✓				<b>Espoused</b> – During fruit salad activity not all students engaged. Glare on IWB makes it hard for some students to see.
3/08/06	Planning Meeting (FN)	✓		✓		<b>Espoused</b> – Discussed Home Literacy Survey (use of student portfolios), Professional readings on Multiliteracies and Assessment for multimodal texts
11/08/06	Reflection by Janelle on Multiliteracies Assessment (A)	✓				<b>Espoused</b> – Need to incorporate more of a critical literacy aspect. IWB perfect for this due to collaboration and social learning process that would aid students with these skills.

14/08/06	Email Janelle re Multiliteracies Assess Yr 4 (A)	✓		✓		<b>Espoused</b> – Does not discuss type of book, audience etc in relation to online resources. Hasn't acknowledged online resources as a type of literacy.
18/08/06	Literacy Block (FN)					<b>Enacted</b> Watching Skipping DVD. Instruction genre for a skipping skill.
19/08/06	Reflection on Multiliteracies Assess Jessica Yr 4 (A)	✓				<b>Espoused</b> – Students struggled with Text User role. Unaware that she wasn't teaching this. Focuses more on critical literacy. Surprising results for one student – ESL, Learning support and no computer at home.
24/08/06	Literacy Block (FN) Bianca Fiona	✓	✓			<b>Enacted</b> – Making a photograph. Technical codes of photos – angle, lighting. Reflection at the end of the Literacy block – Photographs- what makes a good photograph
24/08/06	Planning Meeting (FN)	✓				<b>Espoused</b> – Unit Plan for Term 4 Charlie and the Chocolate Factory. Intel Unit
31/08/06	Literacy Block (FN)	✓	✓			<b>Enacted</b> – Students creating PowerPoint.
07/09/06	Literacy Block (FN)	✓				<b>Enacted</b> - Children typing up instructions in word - skipping
07/09/06	Literacy Block (FN)	✓				<b>Enacted</b> - Sally Fiona – students taking digital photos for task
13/09/06	Planning Meeting (FN)	✓				<b>Espoused</b> - Unit Planning continued, Problems with digital cameras – take only 8 photos and need to be recharged constantly
20/10/06	Planning Document - Term 4 (A)	✓	✓	✓	✓	<b>Espoused</b> – Charlie and the Chocolate Factory. Book and DVD explored.
25/10/06	Planning meeting (FN)	✓				<b>Espoused</b> – Too much to do, no computer labs, trouble with getting tasks completed
25/10/06	Multiliteracies Assessment Dee (A)	✓				<b>Espoused</b> – Text User an area of need. Students who got highest marks were surprising as they were ESL and lower readers.
02/11/06	Literacy Block (FN)	✓				<b>Enacted</b> – Whole class. Writing stories. Story Pyramid on IWB
09/11/06	Literacy Block (FN) Brianna/Jessica	✓				<b>Enacted</b> – Compare/Contrast characters in Charlie and the Chocolate Factory, Compare/Contrast DVD/book

Similarly, the two *early adopters* in the Year 4 Professional Learning Team viewed technology as an “integral part of the learning process” (PLT 2: Interview) with application to “everyday lives and work environments” (PLT 1: Interview). One of the novice teachers believed it was important for students to gain experience with ICTs. She asserted that, “Students need to acquire technological skills so they can use technology in their real world experiences and be able to adapt quickly to new programs” (PLT 3: Interview). Further, she asserted, “Students need to have ample time to explore technology in the classroom” (PLT 3: Interview). These teachers’ perceptions were evident in their classrooms as they integrated IWBs into their classroom routines, applying a *whole class-small group- whole class* organisation strategy within the two-hour Literacy Block (Hill & Crevola, 1997). Observations of classroom organisation revealed the novice (PLT 3) teacher using the IWB for small group activities, with one group of eight students working independently on the IWB or on classroom computers. Students’ experimentation with technology was evident as they completed tasks, navigating through web pages and creating texts with software packages.

However, there were differences in how learning was organised with IWBs in the two spaces. PLT 2, PLT 3 used the IWB for their combined classes, to display and explain briefly what activities were to be undertaken in literacy rotations. There was minimal use of the IWB for events explicitly associated with teaching those activities. Observations in the other teaching space revealed PLT 1 and PLT 4 using the IWB explicitly for teaching in the whole part of the literacy block, but not initially for activities in the small-group portion.

All teachers reflected, experimented and trialled different organisational groupings with the IWBs, based on purpose and contextual factors. PLT 2 reflecting on small group activities suggested that the purpose of activities needed to be considered in decisions about using IWBs. For example, one group activity on the IWB (21/06/06) was perhaps a task done better as independent student work, although it promoted group discussion.

Differences in use were clarified through member checks. PLT 2 indicated that she and her teaching partner (PLT 3) use the IWB for explicit teaching and provided examples of note-taking, immersing students in a variety of texts within genres, and sequencing tasks. PLT 1 indicated that she usually would organise for groups of students to use the IWB independently, but this was not the current situation as they

needed to integrate Year 3 and Year 4 students. Further, she indicated that students needed to stay on task and resolve turn-taking issues for independent group work to be successful. It was not until late April that both classes in this double classroom moved from lessons for the whole group where teaching of literacy content was explicit to include small group activities in their literacy block.


Overall, teachers used the IWB or the computer for a range of purposes. These were for: presentation, recording, research, drawing, publishing, and demonstrating content knowledge. In some instances the IWB or computer served a combination of purposes as teachers became more familiar with the technology and its potential.

### ***Interactivity***

As purposes for using the IWB and the type of activity varied, so did the notion of interactivity. There was a focus here on technical and physical interactivity as there had been with Phase 1 data, but in this case teachers were beginning to develop activities that moved their lessons beyond a skills focus to emphasise more challenging learning experiences. (See IWB Implementation Grid, Table 5.4). In teaching episodes observed on 24/08/06 and 09/11/06 (Table 5.2), PLT 2 and PLT 3 incorporated conceptual activity in compare and contrast activities using a Venn Diagram. In this double teaching space, IWBs were used for small-group activities with students. In these instances, notions of interactivity related to physical and technical interaction with the IWB, with conceptual interactivity dependent upon the intellectual challenge of the task completed. During these activities there was evidence of experimentation and peer discussion as students engaged with Learning Objects and commercially-produced games, or constructed PowerPoint and Photostory presentations.

In PLT 1 and PLT 4's teaching space the IWB was used for whole class teaching, with dominant purpose being presentation of content for students to learn. PLT 1 and PLT 4 presented information through a variety of multimodal texts such as DVDs, Learning Objects, web pages and teacher-created resources. In most instances, interactivity was based on physical and technical interaction on a turn-taking basis predominated.

**Table 5.4 IWB Implementation Grid (Kitson, 2009)**

					Preferred Future
Measurement Categories	Stage 1: Uncertainty/Not evident	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty/ Embedded or Evident
<p><b>Construction of Interactive Learning Environments</b></p>	<p>Learning environment created with IWB replicates traditional classroom talk of initiation, response and evaluation. Interaction is teacher directed.</p>	<p>Engagement with IWBS is at the technical and practical levels of use. Motivation and interaction is defined in terms of physical manipulation of IWB and turn-taking.</p>	<p>Engagement with IWBS is still focused on turn-taking and surface engagement with flashy features of multimedia. Teachers start to select IWB resources which promote higher order thinking.</p>	<p>Engagement with educational content focuses on deeper understanding of the subject matter and focuses on substantive conversations.</p>	<p>The learning environment is engaging and motivating. It moves beyond pragmatic uses to critical and intellectual engagement with the subject matter, with knowledge viewed as problematic and open to multiple interpretations.</p>
<p><b>Integration of IWBs into the curriculum</b> Based on Sandholtz et al. (1997)</p>	<p>Entry stage. Teachers are reluctant to try new things, reverting to traditional teaching methods. Teachers may experience problems with technical issues or the resources.</p>	<p>Adoption stage. A greater effort to integrate technology into daily lessons, but activity choice is limited to replicating existing teaching practice using technology</p>	<p>Adaptation stage. A greater variety of software packages are starting to be used as time-saving tools. Teachers move beyond use for teaching purposes to classroom management and planning.</p>	<p>Appropriation stage. IWBs are used effortlessly as a tool to accomplish tasks. Greater student interaction, with students working with technology for curriculum related tasks.</p>	<p>Invention. Teachers experiment with pedagogical styles and interactions with students. Students actively construct knowledge, with student experts assisting teacher and peers with technological problems. More reflective of teaching practice</p>



Conceptual interactivity was based on teachers' ability to frame open questions to which students could respond. Nevertheless, in most instances traditional patterns of initiation-response were observed with little evidence of substantive conversation. In cases where teachers expected students to complete higher order thinking activities independently, such as a compare/contrast activity recorded on 17/05/06 in Table 5.2, students struggled. However, PLT 1 indicated the need for teaching these skills prior to expecting students to demonstrate them.

### ***Level of ICT Integration***

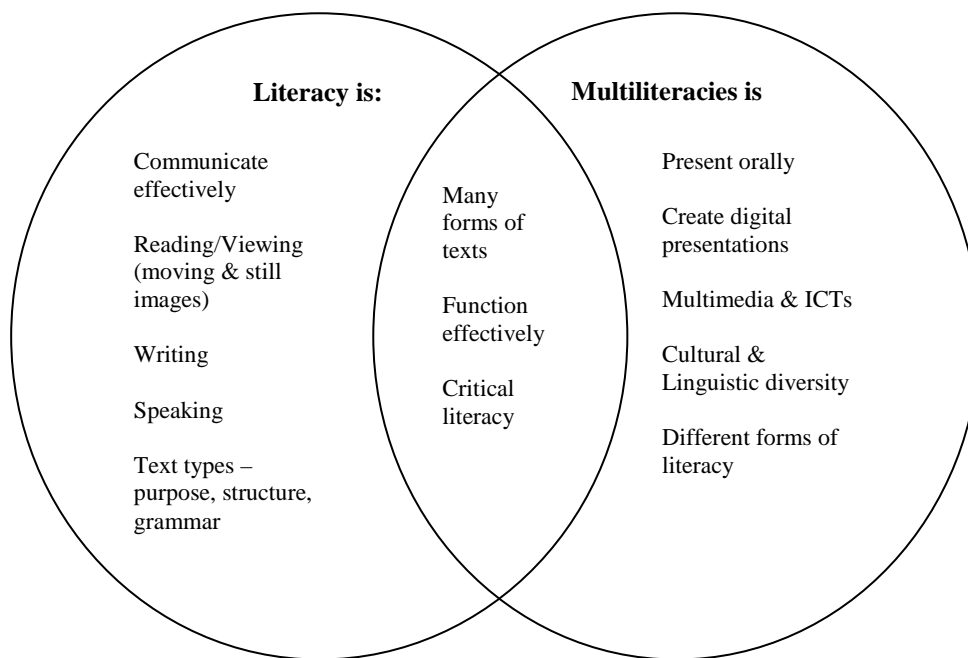
Data collected over the course of Phase 2 indicated that teachers in the Year 4 Professional Learning Team had different levels of ICT integration. These were plotted onto the IWB Implementation Grid in Table 5.4. Compared with findings recorded at the end of Phase 1, all four teachers had experienced considerable growth, with a shift from the *adaption* phase of competence to the *appropriation* stage. IWBs were used on a daily basis to achieve a variety of tasks, including administrative purposes. IWBs and multimodal texts were embedded in teaching and planning, as well as for demonstrating curriculum tasks. Observation in classrooms revealed students learning on their own and tutoring each other, in particular on how to use software packages such as PowerPoint, Learning Objects, and hardware such as digital cameras.

### **How Does the Implementation of Interactive Whiteboards Influence What Counts as Multiliteracies at the Year Level?**

As teachers gained experience with integrating IWBs into their work, and used a greater variety of multimodal texts in the classroom, they reconsidered literacy and how it might be influenced by multimedia and ICTs. In this next section, I report teachers' espoused beliefs about literacy and Multiliteracies and how they shaped their developing conceptualisations. In addition, espoused beliefs and enacted practices are compared to reveal congruence or non-congruence in what teachers believed they should be doing and what they were actually doing in the complex realities of their classrooms.

### ***What Counts as Multiliteracies?***

Teachers' constructs of literacy espoused in interviews were consistent with whole-school results and views of teachers reported in Phase 1. This was broadly constructed, inclusive of a more traditional notion of a print-based view of literacy which included attention to the social purpose of texts and to their linguistic features. Influence of the Literacy Plan 2000-2004 was evident with a focus on speaking and listening, reading and viewing, writing and presenting (See Figure 5.1).



**Figure 5.1. Venn Diagram Comparing and Contrasting Teacher Definitions of Literacy and Multiliteracies**

Teachers' definitions of literacy acknowledged that there were different forms of literacies, an increased variety of texts, and a more critical focus. This critical focus was taken up by one teacher (PLT 1) and developed around her view of literacy as an ability to "critically analyse information given" to "read between the lines" and differentiate valid information on websites (PLT 1: Interview). Another teacher's (PLT 3) version of critical literacy was described in relation to "the different messages" each literacy form (or mode) offers (PLT 3: Interview).

Definitions of Multiliteracies were constructed around literacies as multiple, with a focus on oral presentations and the creation of digital presentations. One teacher was unsure of how to define the term, referred to *Literate Futures* (Education Queensland, 2000a), citing a focus on multimedia and technology, cultural and linguistic diversity, and critical literacy. For the teaching team, the acknowledgement of many forms of texts, the need to function effectively, and a focus on critical literacy were common areas in both constructs of literacy and Multiliteracies.

### ***Multimedia and ICTs***

Implementing IWBs allowed teachers access to a greater variety of multimodal resources which included texts in written, visual and auditory modes where semiotic systems ranged from icons, images, colour animation, voice-overs, music and sounds. Such texts featured in almost all events listed in Table 5.3 as practices that teachers espoused or enacted. For example, they featured in all term planning documents espoused the use of multimedia and ICTs for teaching purposes and/or demonstrating learning outcomes. For instance, an ICT focus had been espoused in Term 1 as an integrating device “using ICT to organise, research, interpret, analyse, communicate, and represent knowledge” (Planning Document Term 1). It was espoused in these planning documents that students would communicate with other individuals throughout the world, use Microsoft Excel to organise, interpret and analyse data, and, use the Internet to research information about the Commonwealth Games. Students would then represent their knowledge using publishing software. There were references to teachers’ use of a variety of written and digital texts, such as web pages, Learning Objects, CD Roms and DVDs to construct and gather information about topics. However, in Term 1, discussions about assessment items in early planning meetings did not indicate a creative use of technology for presentation, in spite of it being espoused in planning documents. In Terms 2 and 4, assessment items espoused the use of technology for the presentation of information reports, narratives and email.

Teachers’ espoused use of IWBs was consistently enacted in classroom settings. Observations of classroom practice revealed the use of multimodal texts for teaching and learning purposes ranging from web pages, CD Roms, DVDs, Learning Objects, and commercially-produced games, to teacher-created, multimodal texts. In all school terms students used software packages to display their knowledge. However, during the

construction of the Community Learning Centre, completion of tasks was an issue discussed in the planning meeting on 25/10/06 (Table 5.3). The limitations of existing classroom computers for supporting assessment items based on software packages were also discussed. For, example in Term 1 Years 3 and 4 only had one computer with the software needed to complete the task required. Whilst other year levels had similar problems, some teachers were able to send their students unsupervised to different year level classrooms that had the software to complete tasks. One member of the Professional Learning Team (PLT 1) commented, “this was more problematic for younger students,” due to behavioural issues (Planning Meeting: 25/10/06). She further indicated displeasure at having to settle with PowerPoint rather than Photostory. All teachers agreed that they had planned too many tasks in this unit. They had developed the unit as part of their training in the Intel Teach Program. A requirement of the training was that the teachers demonstrate their learning using a wide range of software packages and they had not adapted the units prepared for that purpose when moving back into their classroom practice

In summary, the use of multimedia and ICTs was consistently evident in teachers’ espoused and enacted practices. The construction of the Community Learning Centre and the Intel Teach Program were critical events in teachers’ reflective use of IWBs, shaping the reality of enacted practice with Multiliteracies. Teachers consciously considered ways to integrate multimediated resources into their practice.

### *Semiotic Systems*

A teaching focus on semiotic systems is important for the interpretation and construction of multimediated resources. As teachers implemented IWBs, there was increased attention to the semiotic systems of multimodal texts. There are 13 references shown (Table 5.3) to different modes of communication, with particular reference to the visual mode. Most of these references were espoused in either teacher reflections, interviews, the Multiliteracies Pedagogical Reflective tool or planning documents. In Term 1 and 2 planning documents (Table 5.3) there was no focus on how the semiotic systems independently or collaboratively combine to realise meaning in multimedia and technological resources. In completing the Multiliteracies Pedagogical Reflective Tool (Butler, 2003), teachers reported having a limited understanding that texts can incorporate a range of semiotic systems. Two commented that they were “not sure on

this one” (PLT 1; PLT 4). They may have been unfamiliar with the term “semiotic systems”. PLT2 said that she needed more information (Email: 21/06/06). By Term 4, some evidence of teacher growth was apparent in planning documents, with teachers’ references to looking at how books “use emotive and descriptive language to convey meaning, while movies use graphics, sound and symbolic effects. Dialogue and thinking in books is explicit while in movies, it is represented through a variety of different ways, including intonation, gestures, expression, music and song” (Term 4 Planning document). However, these statements are espousals and none of the four teachers were observed enacting them.

Three of the 13 events relate to enacted teacher practice. In one instance, PLT 1 (on 25/05/06) had scanned in a picture book, “Wombat Goes Walkabout”, making it more interactive. She also had embedded interactive elements, including ‘What am I’ slides based on animals in the book. In this lesson she briefly questioned students on the visual features, asking them “What is it (the photo) telling us? (PLT 1: Field Notes: 25/05/06). However, this was not an elaborated conversation. In another instance, the focus in PLT 2 and PLT 3’s class was on making photographs to match instructions for an exercise sequence. In this lesson there was discussion about what needed to be considered when taking a photo. Examples were explored looking at the technical codes of a photo, which included backgrounds, foregrounds, lighting, distance and angles. This was the only event I observed in which there was enacted practice in relation to a metalanguage for talking about how photos make meaning. Whilst there was growth in this dimension of multiliterate practice over Phase 2, and the use of the Multiliteracies Pedagogical Reflective Tool allowed for evaluation and reflection, attention to semiotic systems and a metalanguage is one that teachers need to develop and enact in their practice.

### ***Cultural and Linguistic Diversity***

Ensuring students from diverse cultural and linguistic groups have access to literacy education is an important dimension of Multiliteracies. Thirteen of the 68 events in Table 5.3 made mention of cultural and linguistic diversity. All were espousals rather than enacted events. Cultural and linguistic diversity was espoused in varying degrees in planning documents. This ranged from an indication of classroom teachers trying to ascertain student knowledge using such tools as “before and after charts”

(Term 2 Planning Document 25/03/06, Table 5.3), to valuing students' prior knowledge and experience with a movie which formed part of most students' Primary Discourse, or home literacies (Term 4, Table 5.3). In Term 1 a unit plan proposed learning outcomes which sought to explore cultural similarities and differences among Australian, Chinese, and Aboriginal and Torres Strait Islanders. Chinese is the Language Other Than English (LOTE) that students learn in this school from Grade 4, so the outcome aligned with those learning outcomes.

In responding to the Multiliteracies Pedagogical Reflective Tool (Butler, 2003), three teachers (PLT 1, PLT 3, PLT 4) reported understanding the need to value students' experiences and backgrounds and that they considered this was part of what they did in their teaching. PLT 1 indicated that ICTs were valued by both the school and community and provided "ways for students with lower literacy skills to achieve success" (PLT 1). However, PLT 1, PLT 3 and PLT 4 indicated minimal understanding that students learn literacy through combinations of their Primary Discourse, home literacies and Secondary Discourses, and school literacies. PLT 1 indicated she tried to value the diversity of her students, but that they possessed "limited literacy resources" and that she needed to "expose them to other literacy resources" (PLT 1). PLT 4 indicated she was "aware that her students may not have much access to literature" (PLT 4), but used informal text types to suit student home lives. In contrast, PLT 2, indicated she was "exposing them (students) to as many things as possible – seeing value in all" (PLT 2). These teachers (PLT 1, PLT 4) had constructed their explanations of diversity around a deficit view of learners.

As a result of a conversation with teachers after findings from the Multiliteracies Pedagogical Reflective Tool, a survey was constructed and implemented to provide data about students' home literacy practices. Results of the Home Literacy Survey (Results) revealed the types of literacy practices students engaged in and their cultural and linguistic diversity. Year level data revealed that 11 of 93 students did not own a computer. 77 students had computers that were workable, five had computers that were broken, and 14 others had computers but no access to the Internet. Of the same 93 students, 78 nominated playing computer games as the most prevalent use of computers.

The cohort of 93 students drew from a range of culturally and linguistically diverse families. Cambodia, Chinese, Hmong, Hungarian, Moti, Philipino, Samoan,

Romanian and Vietnamese original ethnicities were represented. Teachers were unaware of whether students spoke another language at home, though data at Phase 2 revealed that 20% of the 93 students did. An audit of students' home practices, allowed teachers access to information about student diversity and home literacy practices. Teachers had started to move forward in their journey to embed Multiliteracies into their teaching practice through greater attention to some aspects of multiliterate practices. In summary, notions of deficit in relation to student knowledge and skills appeared to challenge their attempts.

### *Critical Literacy*

The notion of critical literacy was evident in teachers' definitions of literacy and Multiliteracies, and was reflected in the school's Literacy Plan 2000-2004. Some teachers had considered and incorporated critical literacy into their teaching programs prior to the introduction of IWBs. Of the 68 recorded data sources in Table 5.3, 12 events mentioned the importance of critical literacy as espousals. In planning documents a critical literacy perspective was espoused as either learning outcomes or implied in the wordage of culminating activities. For example in Term 2 students were required to construct a multimedia presentation with terms such as "combine and manipulate" and "persuasive" implied (Table 5.3). These terms were in line with syllabus outcomes that when interpreting and constructing texts, and when drawing on the textual resources that "students identify positive and negative textual representations" (Term 2 Planning Documents). However, there was no mention in the activities section, of activities that addressed this outcome. There was no evidence of a critical literacy perspective in observations of teachers' practice.

However, in responding to the Multiliteracies Pedagogical Reflective Tool (Butler, 2003) some teachers (PLT 2, PLT 3) reported that they enacted a critical literacy perspective in the classroom. PLT 2 and PLT 3 reported that critical literacy activities were included in their literacy block in an email or journal reflection (24/07/06, Table 5.3). One of these teachers (PLT 3) detailed how students explored the types of movies advertised, types of advertisements, and the target audience of the magazine of the *Just Kidding Magazine*. The other two reported that they understood that texts are consciously constructed to serve particular social, cultural, political and economic purposes. But, they did not always apply it to reading activities. One of these

teachers indicated that she had started to explore this concept through questioning and analysing how texts position readers and for them not to “take information on face value” (PLT 3). In spite of the implicit evidence of a critical literacy perspective in the School Literacy Plan (2000-2004), and its espousal in team planning documents, teachers within this team did not enact in their work a sustained, critical literacy approach

To explore the opportunities offered by teachers using IWBs for Multiliteracies, data were then examined for how teachers’ practices aligned with Multiliteracies pedagogy (Cope & Kalantzis, 2000). Multiliteracies pedagogy was designed to supplement teachers’ current approaches to teaching literacy (Cope & Kalantzis, 2000). There were four aspects Multiliteracies Pedagogy: situated practice, overt instruction, critical framing, and transformed practice which are reported.

### ***Multiliteracies Pedagogy***

#### **Situated Practice**

A focus on situated practice was evident in data from the Multiliteracies Pedagogical Reflective Tool (Butler, 2003) where teachers reported understanding that students need to be immersed in multiliterate practices and topics that are part of their community context. All four teachers indicated that they had begun exploring ways it might inform classroom practice, and they were trying a variety of activities and resources to link home and school for authentic learning purposes. Two teachers (PLT 1, PLT 3) reported they had used web-pages, newspapers, current affairs, books and magazines. One of these indicated that she did not focus on community texts but, “rather texts they are not exposed to” (PLT 1). Examples of this were observed enacted in her practice on a variety of occasions, in particular on 21/03/06 when students used web pages, newspapers, and multimodal texts.

Teachers reported varying responses in relation to drawing on students’ prior knowledge and out of school experiences. PLT 1 indicated that she drew “on prior knowledge particularly in relation to narrative”, but that it was “harder for non-fictional text” (PLT 1). One of the novice teachers (PLT 4) stated that her “understanding of students’ reader identities mainly related to academic ability rather than attitude” and that there is “mainly grouping on ability, some on interest” (PLT 4). Drawing upon students’ prior knowledge and experiences was supported also in teachers’ initial



interviews and planning documents. Two teachers related what counted as learning as “redefining prior knowledge, skills and content” (PLT 3) and “taking what you know and extending it” (PLT 4). Further, planning documents for Term 4 situated practice with students’ out-of-school experiences through movies and DVDs. This was observed with teachers in one classroom (PLT 2, PLT 3) reading the *The Lion, the Witch and the Wardrobe* which related to many of the students having seen the movie, *Narnia*. Late in 2006, teachers also read *Charlie and the Chocolate Factory* to students as part of their integrated theme of work.

### **Overt Instruction**

Responses to the Multiliteracies Pedagogical Reflective Tool (Butler, 2003) provided data about teachers’ understandings of multimodal texts and those areas that they had reported as features of their teaching practice. Two teachers (PLT 1, PLT 4) indicated that they understood that students should be interpreting, and producing a balanced range of texts – oral, print and multimedia by writing, listening, speaking and viewing. They said that they were exploring this in their teaching practice. The other two (PLT 2, PLT 3) indicated that they were immersed in this concept, PLT 1 stating that she had tried “to ensure all text types are covered over a semester”. However, the same teacher tended “not to formally assess viewing or listening” (PLT 1). Observation of students’ completion of tasks in the classroom also supported a conclusion that teachers’ had enacted practice regarding the use of ICTs to represent their thoughts through writing and visual means.

Whilst acknowledging the use of a range of literacy texts in the classroom, the purpose and audience of these text types was not always considered by all teachers in the team. PLT 1 reported that she “didn’t implement it [sense of purpose and audience] as much as she should” as she struggled with the lack of skills and engagement of her students (PLT 1). She suggested that she did not pay enough attention to the audience of a text. PLT 4 who acknowledged she understood this concept, had yet to implement it in her classroom. PLT 3 reported using authentic texts such as magazines, websites, newspapers, advertisements and television. PLT 2 indicated she was immersed in this concept, employing “different texts with a purpose, whether it be to another year level, own class or whole school” (PLT 2). This difference in consideration of audiences and purposes of texts was reflected in data from the Multiliteracies Assessment Tool, where students in all classes responded poorly to questions relating to audience and purpose,

or Text User practices (Freebody & Luke, 1990). This tool was developed with teachers after completion of the Multiliteracies Pedagogical Reflective Tool. It aimed to provide data about students' current literacy skills with multimodal texts. Reflections provided by three teachers (PLT 1, PLT 3, PLT 4) on 11/08/06, 19/08/06, and 25/10/06, indicated that students struggled with the pragmatic role of the Text User. PLT 3 commented that she was unaware that she had not attended to this role in her teaching practice.

Teachers reported different understandings that texts may have several possible meanings for readers. Two teachers (PLT 3, PLT 4) understood a text may have multiple meanings and were encouraging students to develop this awareness. PLT 3 reported doing this with all texts, providing examples related to reading group discussions during whole class activities or guided reading sessions. However, the second teacher (PLT 4) stated that she only held discussions after reading, but it was "not about what the author was trying to achieve", rather it was comprehension focused.

Three teachers (PLT 1, PLT 3, PLT 4) indicated some understanding that meanings are actively constructed by interactions between readers and texts but said that they had not begun exploring this in the classroom. The fourth teacher (PLT 2) noted that she catered for this in both whole-class and small-group reading situations. Another key understanding in relation to multimodal texts was the blending of genres to produce hybrid texts. The notion of intertextuality where elements of one text are embedded in another is a central concept. The two novice teachers (PLT 3, PLT 4) reported that this concept was new to them and that they had no understanding of it. A third teacher (PLT 1) indicated some awareness of it but that it was not informing her teaching practice. She commented that "I am aware that texts are changing as society changes and feel that I do expose students to this, but perhaps don't make it explicit" (PLT 1). The fourth teacher (PLT 2) stated that this idea had started to inform her practice, where she discussed language differences in the Lion, the Witch and the Wardrobe. She indicated on the 21/06/06 that the notion of intertextuality was something she required more information on to enact Multiliteracies in the classroom.

Teachers reported different levels of understanding in relation to the use of a metalanguage and explicit instruction of the semiotic systems operating in texts. For one teacher (PLT 4) the use of a metalanguage and attention to semiotic systems was a new concept, while another (PLT 3) indicated she had some understanding. A third teacher (PLT 2) understood this and was exploring ways to use this in the classroom; however,

it was an area she identified on the 21/06/06 as needing more information. A fourth teacher (PLT 1) indicated she was attending to semiotic systems and a metalanguage, referring to this as “the deconstruction phase of genre and in reconstruction” (PLT 1). Overall, findings in relation to teachers’ overt instruction indicated that all teachers employed a wide range of multimodal texts in their classrooms. However, including the multimodal features as explicit aspects of learning experiences was in early stages of development. Teachers’ practice had only started to explore semiotic systems and the use of metalanguage.

### **Critical Framing**

The concept of critical framing is aligned with critical literacy and the need to teach students’ analysis of texts from a critical perspective. This entails recognising that content is selected and manipulated to convey particular meanings which influence the reader. Two teachers (PLT 1, PLT 4) reported some understanding of this concept, but did not address this in their teaching practice. The other two teachers (PLT 2, PLT 3) reported they understood the concept and were exploring it in the classroom. One of these teachers (PLT 1) believed that a focus on critical reading practice was “more conducive in upper primary” and she “does not do this with Year 4 students” (PLT 1). Observations of enacted teaching practice did not provide evidence of application in these classrooms. As with the critical literacy perspective discussed previously in the dimensions of multiliterate practices, some teachers (PLT 1, PLT 4) in this team had started to enact this in their practice, signalling it as an area to be developed.

### **Transformed Practice**

If students are to be multiliterate they need to go beyond reading and interpreting multimodal texts as consumers and produce texts in ways that incorporate the resources available in new technologies. Three teachers (PLT 1, PLT 2, PLT 3) reported that students draw upon available designs, resources or their current literacy skills, knowledge and processes. A fourth teacher (PLT 4) reported she was immersed in drawing upon students’ knowledge and resources. Drawing upon student’s knowledge is supported in her initial interview where she defined an aspect of learning to “applying it to a new situation” (PLT 4). One of the teachers (PLT 1) discussed how, students draw on available designs and resources, with “problem solution paragraphs linked and informed one another” (PLT 1).

To transform practice, Multiliteracies pedagogy requires students to transfer available designs and resources to another context. For this understanding, teachers reported a range of responses. One teacher (PLT 3) indicated no understanding of this concept; two (PLT 1, PLT 4) suggested some understanding but no application, with one teacher (PLT 2) indicating some understanding with some exploration of application in her teaching practice. One teacher (PLT 4) stated that while she understood “the importance of transforming knowledge to new contexts but I am trialling ways to help students perform transfer of skills” (PLT 4). One observed event relating to this notion was on the 25/05/06 where students had to transform their knowledge about environments and animals to complete a story innovation of the text, “Wombat Goes Walkabout”. On other occasions students were observed transforming their knowledge and applying it to a variety of student assessment tasks, for example, making Powerpoint presentations on a particular environment.

### ***Where To From Here?***

In summary, information from all data sources converged to allow a view of teachers’ understandings of contexts in which multiliterate practices were embedded, the nature of multimodal texts, and teachers’ approaches to pedagogy mediated by the IWB. The implementation of IWBs was starting to influence teacher beliefs about multiliterate practice with some evidence that changes were beginning. Teachers used a wide range of multimodal texts in their literacy programs. In considering what counted as Multiliteracies, they recognised that multimodal texts presented them with new literacies, new contexts and new understandings of texts that they needed to consider. My research with these teachers was a critical event for them, as they reflected on my questions and reconsidered their teaching practice. This phase tracked how teachers’ beliefs and practices developed in some areas, in particular in using multimodal texts. This underpinned a growing recognition of the need to develop a deeper understanding of the multimodal nature of texts.

### ***Summary of Year Level Findings***

Teachers in the Professional Learning Team implemented the IWB into their classroom routines during a 2-hour literacy block. Differences were noted in

observations of teachers' practice. In one double-teaching space, teachers used the IWB mainly for small-group activities. However, in the other space teachers used the IWB for explicit teaching with the whole class. All teachers espoused its use for explicit teaching with the whole class, for small group activities, and for reflection and lesson closure with the whole class group. Data collected over the course of Phase 2 indicated that teachers in this Professional Learning Team were generally at the *appropriation* stage (Sandholtz et al., 1997) where IWBs were used on a daily basis to accomplish both teacher and students tasks. Over a one year period, the four teachers had moved from the *adoption* phase identified in Phase 1 data. Critical events in this movement were the teachers' participation in professional development which had focused on incorporating objectives of promoting students' higher order thinking, and, their engagement in this research. This movement is documented in the IWB Implementation Grid in Table 5.5.

As teachers experimented with IWBs and used them for a wider range of purposes and activities, their notions of interactivity had begun to change from those indicated in Phase 1 data. They had started to consider how they might construct more interactive learning environments and ways to select activities and resources which would promote students' higher order thinking.

**Table 5.5 IWB Implementation grid (Kitson, 2009) End of Phase 2**

	End of Phase 1	End of Phase 2				Preferred Future
Measurement Categories	Stage 1: Uncertainty/Not evident	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty/ Embedded or Evident	
<b>Integration of IWBs into the curriculum</b> Based on Sandholtz et al., (1997)	Entry stage. Teachers are reluctant to try new things, reverting to traditional teaching methods. Teachers may experience problems with technical issues or the resources.	Adoption stage. A greater effort to integrate technology into daily lessons, but activity choice is limited to replicating existing teaching practice using technology	Adaptation stage. A greater variety of software packages are starting to be used as time-saving tools. Teachers move beyond use for teaching purposes to classroom management and planning.	Appropriation stage. IWBs are used effortlessly as a tool to accomplish tasks. Greater student interaction, with students working with technology for curriculum related tasks.	Invention. Teachers experiment with pedagogical styles and interactions with students. Students actively construct knowledge, with student experts assisting teacher and peers with technological problems. More reflective of teaching practice	
<b>Construction of Interactive Learning Environments</b> Based on O'Rourke (2001)	Learning environment created with IWB replicates traditional classroom talk of initiation, response and evaluation. Interaction is teacher directed.	Engagement with IWBS is at the technical and practical levels of use. Motivation and interaction are defined in terms of physical manipulation of IWB and turn-taking.	Engagement with IWBs is still focused on turn-taking and surface engagement with flashy features of multimedia. Teachers start to select IWB resources which promote higher order thinking.	Engagement with educational content focuses on deeper understanding of the subject matter and involves substantive conversations.	The learning environment is engaging and motivating. It moves beyond pragmatic uses to critical and intellectual engagement with the subject matter, with knowledge viewed as problematic and open to multiple interpretations.	
<b>Understanding of Multiliterate practices</b>	No understanding of the changing contexts of literacy – literacy as a social practice.	Literacy as social practice. Acknowledgement that literacy is learned through Primary and Secondary Discourses. There is valuing of student	Teachers conduct audits of students' literacy resources. Deficit notions inform teachers' understandings of students' capabilities. Greater access to and use	Valuing of the diversity of students' experiences and backgrounds at the collective level is evident in teaching. There is explicit teaching of semiotic systems of meaning	Teaching incorporates all aspects of multiliterate practices - Multimedia and ICTs, Semiotic systems, Critical literacy, and cultural and linguistic diversity. This is embedded in real life	

		<p>diversity at the individual level. There is inclusion of multimodal texts and some attention to the different semiotic systems they use.</p>	<p>of new forms of literacy (multimodal texts) in a range of contexts. Some explicit teaching in relation to the meaning-making of the various semiotic systems. Some awareness on the selection and manipulation of resources to convey meanings to influence the reader.</p>	<p>making, using a metalanguage to describe. Greater attention to the selection and manipulation of content to influence the reader.</p>	<p>contexts using a range of authentic texts. Focus on literacy demands of curriculum areas.</p>
<p><b>Understanding about multimodal texts</b></p>	<p>Understandings about texts are based on print-based notions.</p>	<p>Meanings are actively constructed between readers and texts. Texts are consciously constructed and have particular social, cultural, political and economic purposes.</p>	<p>A text may have several meanings. Texts as sites of a range of semiotic systems. Texts are multimodal, interactive and non-linear.</p>	<p>Texts continue to change, with the creation of hybrid texts which may serve more than one purpose. Notions of intertextuality in texts are explored.</p>	<p>Texts evolve and become increasingly hybrid and intertextual, combining and recombining technologies in different ways. Society and technology changes and texts reflect these changes.</p>
<p><b>Source: Literate Futures</b></p>					
<p><b>Understanding of Multiliteracies Pedagogy</b></p>	<p>There is no understanding of Multiliteracies pedagogy (Situated Practice, Overt Instruction, Critical Framing, Transformed Practice</p>	<p>There is minimal understanding of Multiliteracies pedagogy but it is not evident in teaching practice.</p>	<p>There is understanding of Multiliteracies pedagogy and it is starting to inform teaching practice.</p>	<p>There is greater evidence of application of Multiliteracies pedagogy in planning and teaching practice, with some active reflection occurring.</p>	<p>All aspects of Multiliteracies pedagogy are completely embedded in teaching practice. Planning and teaching practice is informed by reflection and the collection and analysis of evidence.</p>

The multimodal nature of texts used with IWBs appeared to support this development. This development would place teachers as moving from an *awakening* phase to an *enlightenment* phase on the grid.

Espoused definitions of literacy and Multiliteracies for this Professional Learning Team were similar to Whole School notions and echoed the views of teachers in Phase 1. They espoused a broad conception, with recognition of an increased range of texts, different forms of literacy, and a more critical focus. Whilst espousal and enacted use of multimedia and ICTs were evident in all data, where critical literacy was concerned, I observed it only in participants' espousals. Some teachers reported teaching it, but I did not see it in teachers' practice. In spite of the high use of multimodal texts, there was minimal reference to how semiotic systems make meaning. There was no metalanguage used to describe this. The only enacted practice evident was the exploration made of the technical codes in photographs. This activity had potential for teacher and students to discuss more critical aspects of literacy relating to how symbolic codes create meaning. But the teacher did not take up the opportunity. Cultural and linguistic diversity were evident in varying degrees in planning documents that focused on a need to ascertain students' prior knowledge and to value students' primary discourses. The only enacted practice observed related to use of before and after charts to draw out students' prior knowledge.

Teachers linked students' ability to 'do literacy' and work with IWBs to a deficit view of students' home language experiences. These beliefs were based on assumptions about the students' home literacies and perceptions about the limited resources available to students at home. However, through participation in this research, teachers undertook audits of students' literacy resources in a Home Survey. This information allowed them to consider the findings and apply it to their teaching practice. These findings suggest that this Professional Learning Team was moving to an *enlightenment* stage in relation to an understanding of multiliterate practices.

The multimodal nature of texts available with IWBs was a significant factor in influencing teachers' thinking about texts. This allowed for an exploration of teachers' understandings in relation to multimodal texts, and of how their teaching practices aligned with Multiliteracies pedagogy. These two aspects are central to teaching with IWBs and multimodal texts and are reflected in the theoretical literature reviewed in



Chapter 2. These two aspects were added to the Y axis in the IWB Implementation Grid (Kitson, 2009) where findings are mapped for this Professional Learning Team.

Concepts such as intertextuality and hybrid texts were new to teachers and this was evident in their different levels of understandings of these concepts reported in the Multiliteracies Pedagogical Reflective Tool. Teachers differed in their focus on situating practice. Two indicated that they used a variety of texts from students' environments. This was observed in their enacted practice. Teachers also espoused provision of overt instruction in which students interpreted and produced a range of texts. This too was supported in their enacted practice. However, data indicated that teachers' espoused attention to purpose and audience issues that are associated with these text types was not always understood or taught. Similarly, some teachers, were aware of critical framing and applied this knowledge to their classroom practice. All four teachers, indicated transformations in their practice, where students are now called on to apply their evolving literacy skills, knowledge and processes to new situations. In each of these aspects, findings suggest that teachers were at the *enlightenment* stage.

### **Teacher Level: Case Study**

Previous results have been reported as findings as the Whole School level and Professional Learning Team level. In this section results from case-study data are described to provide insights about how one teacher used the IWB in her classroom and how this influenced her beliefs, practices and understandings of Multiliteracies. The teacher (PLT 1) in this case-study is a member of the Year 4 Professional Learning Team, addressed in an earlier section of the chapter and also one of the *early adopters* reported in Phase 1 of this research. Janelle (pseudonym) was selected as a case study as she had actively participated in this study, eagerly completing most aspects requested by the researcher. Her participation offered a more complete picture of one teacher using IWBs for literacy teaching.

Janelle had taught for approximately 11 years in a variety of schools within Australia and the South Pacific and at the time of the study taught a Year 4 class, consisting of 28 students: 13 boys and 15 girls. At this school, Janelle played a pivotal role in using IWBs within classroom settings and was involved as a mentor and instructor in a number of educational initiatives in regards to the use of technology

within classrooms. From Term 3, she was reassigned within the school to a non-teaching role. However, she continued to attend planning meetings where possible and maintained a commitment to developing her teaching practice.

Focusing on Janelle allowed for an exploration of how one teacher grappled with implementation of IWBs and the variety of resources they afford. I sought to explore how this teacher and her students constructed everyday life as they interacted with multimodal texts. Her beliefs and practices were documented to examine if there was congruence between what she espoused and what she enacted and how this influenced her constructions of literacy knowledge.

Data were collected during literacy blocks over 12 days between February and June, 2006, and Janelle's reflections were recorded in email correspondence and formal reflections were examined. These literacy events are listed in Table 5.6. These sources of data shown in the table were used to identify observed and/or reported chains of events, which included descriptions of multiliterate practices. A broad description of literacy events within the classroom was developed from analysis of these data sources and then compared with Janelle's reflections, for evidence of alignment. Structured reflections after each observed event were designed to provide focused information and to reveal her insights about the types of texts she used, her teaching practices, and teaching resources used. As recorded in Table 5.6, for some days both fieldnotes of observed events and teacher reflections for the same event were available, making possible a contrastive analysis between Janelle's espoused beliefs and her enacted practice.

The analysis of multiliterate practices for these twelve days is shown in Table 5.6. The first column recorded the date of observed events, with events and data sources in the second column. Two types of analyses are represented in the remaining columns. Analyses of multiliterate practices as described in the framework of Cope & Kalantzis (2000) are provided in the third column. The fourth column presents a summary of my interpretations of teacher and/or student actions related to Multiliteracies. This forms the basis for answering the first question of this study

**Table 5.6 Table of Data Sources Teacher Level**

**Critical Events**

Date	Event	Multiliteracies (Cope & Kalantzis, 2000)				Comments
		MM & ICT	SS	C/L div	CL	
	<i>Data source: FN = Field Notes A = Artefact TR = Teacher Reflection</i>					MM = multimedia ICT= information communications technology SS = semiotic systems C/L Div = cultural/linguistic diversity CL = critical literacy
23/02/06	Initial Interview Teacher Reflection (A)	✓			✓	<b>Espoused</b> - Technology as central to learning and potential for student achievement, acknowledged that students should be critical users.
01/03/06	Note taking lesson (FN)	✓				<b>Enacted</b> – Use of multimodal texts – Cut and pasted Internet text and photos into IWB software. Skimming/scanning based on keywords
02/03/06	Teacher Reflection (TR)	✓				<b>Espoused</b> - Appropriate skills for this type of text. Text too difficult for students.
13/03/06	Email – Teacher Reflection (TR)	✓				<b>Espoused</b> - Internet texts used live or cut and paste. “Internet texts really needs the reader to focus on the specific text, and not everything else on the page”
16/03/06	Sports Profile (FN)	✓				<b>Enacted</b> – Comparison of two webpages for same sportsperson. Credibility of websites briefly discussed
16/03/06	Teacher Reflection Sports Profile (A)	✓			✓	<b>Espoused</b> – Using two different texts and discussing differences between credibility of sources. Texts targeted at higher level than perhaps Year 4. Choice of sportsperson – Australian, Aboriginal and female representative.
21/03/06	Literacy block (FN)	✓				<b>Enacted</b> - Variety of texts used, including webpage, newspaper, and IWB. Teacher discusses differences between text types - factual
21/03/06	Teacher Reflection Literacy block (A)	✓				<b>Espoused</b> - Internet site too hard for students. Lack of parental help related to lack of success of students.
30/03/06	Teacher Reflection ICT Pedagogical Licence	✓				<b>Espoused</b> – Discussed differences between ICT integration versus ICTs as integral to learning
05/04/06	Literacy Block (FN)	✓				<b>Enacted</b> – Easter activities – Computer activities - research, Internet Games
05/04/06	Literacy Block (TR)	✓				<b>Espoused</b> – Text editing game too challenging, Research activities too difficult
03/05/06	Literacy block (FN)	✓				<b>Enacted</b> – Navigate Intranet to locate Year 4 Webpage and link to South East Water , Water Cycle Learning Object. Playing game on the Wetlands CD-Rom.

11/05/06	Intel Master Trainer Professional Development – Teacher Reflection	✓				<b>Espoused</b> - Different viewpoints between this PD and ICT Pedagogical Licence in relation to notions of integration and ICTs as integral. Intel focuses on only using ICTs if they were the best tool. Limited software packages for demonstration of student outcomes – Publisher, Word, PowerPoint. Exemplary practices have moved beyond these programs alone.
17/05/06	Literacy block (FN)	✓				<b>Enacted</b> – Night of the Bilby Learning Object. Teacher directed activity first. Focus questions to questions related to content of game. Computer Activity – Compare/Contrast Rainforest/Desert Environments. Students found it difficult to locate information to complete questions.
17/05/06	Teacher Reflection Literacy Block	✓	✓			<b>Espoused</b> – Learning Objects offer different modes of communication –visual, written, sound.
<b>Date</b>	<b>Event</b>	<b>Multiliteracies (Cope &amp; Kalantzis, 2000)</b>				<b>Comments</b>
	<i>Data source: FN = Field Notes A = Artefact TR = Teacher Reflection</i>	<b>Dimensions of Practice</b>				
		<b>MM &amp; ICT</b>	<b>SS</b>	<b>C/L div</b>	<b>CL</b>	<b>MM = multimedia ICT= information communications technology SS = semiotic systems C/L Div = cultural/linguistic diversity CL = critical literacy</b>
23/02/06	Initial Interview Teacher Reflection (A)	✓			✓	<b>Espoused</b> - Technology as central to learning and potential for student achievement, acknowledged that students should be critical users.
01/05/06	Multiliteracies Reflective Tool Note-taking lesson (FN) Janelle (A)	✓	✓	✓	✓	<b>Enacted</b> – Use of multimodal texts – Cut and pasted internet text and photos into IWB software. Skimming/scanning based on keywords
02/05/06	Email – Teacher Reflection (A) Teacher Reflection (TR)	✓				<b>Espoused</b> – Appropriate skills for this type of text. Text too difficult for students.
13/08/06	Emailing Teacher Reflection (TR)	✓				<b>Espoused</b> - Plagiarism is a bad thing. Object and pasted internet texts really need to be read to
14/06/06	Learning Object Teacher Reflection	✓				<b>Espoused</b> - The specific text and title were fine. Else on the Object. “Couldn’t think of a better way
16/03/06	Sports Profile (FN)	✓				<b>Enacted</b> - Complexity of two webpages for same sportsperson. Credibility of websites briefly
11/08/06	Email – Teacher Reflection	✓				<b>Espoused</b> – Does not discuss type of book, audience etc in relation to online resources. Hasn’t
16/03/06	Teacher Reflection Sports Profile (A)	✓		✓		<b>Espoused</b> - Discusses differences between credibility of sources.
14/08/06	Multiliteracies Assessment (TR)	✓				<b>Espoused</b> - Not a higher level than perhaps a critical literacy aspect. IWB or Authoria due to additional and moderate presenting process that would aid students with these skills.
21/03/06	Literacy block (FN)	✓				<b>Enacted</b> - Variety of texts used, including webpage, newspaper, and IWB. Teacher discusses differences between text types - factual
21/03/06	Teacher Reflection Literacy block (A)	✓				<b>Espoused</b> - Internet site too hard for students. Lack of parental help related to lack of success of students.
30/03/06	Teacher Reflection ICT Pedagogical Licence	✓				<b>Espoused</b> – Discussed differences between ICT integration versus ICTs as integral to learning
05/04/06	Literacy Block (FN)	✓				<b>Enacted</b> – Easter activities – Computer activities - research, Internet Games
05/04/06	Literacy Block (TR)	✓				<b>Espoused</b> – Text editing game too challenging, Research activities too difficult
03/05/06	Literacy block (FN)	✓				<b>Enacted</b> – Navigate Intranet to locate Year 4 Webpage and link to South East Water , Water Cycle Learning Object. Playing game on the Wetlands CD-Rom.

11/05/06	Intel Master Trainer Professional Development – Teacher Reflection	✓					<b>Espoused</b> - Different viewpoints between this PD and ICT Pedagogical Licence in relation to notions of integration and ICTs as integral. Intel focuses on only using ICTs if they were the best tool. Limited software packages for demonstration of student outcomes – Publisher, Word, PowerPoint. Exemplary practices have moved beyond these programs alone.
17/05/06	Literacy block (FN)	✓					<b>Enacted</b> – Night of the Bilby Learning Object. Teacher directed activity first. Focus questions to questions related to content of game. Computer Activity – Compare/Contrast Rainforest/Desert Environments. Students found it difficult to locate information to complete questions.
17/05/06	Teacher Reflection Literacy Block (A)	✓	✓				<b>Espoused</b> – Learning Objects offer different modes of communication –visual, written, sound.
18/05/06	Email (TR)	✓					<b>Espoused</b> - Difficulty of previous compare/contrast task related to inability of most students to compare
23/05/06	Story innovation (FN)	✓	✓				<b>Enacted</b> – Digital Storybook. Uses of modes of written and visual codes for student engagement.
25/05/06	Teacher Reflections Story Innovation (A)	✓	✓				<b>Espoused</b> - IWB engaging, modes catering to learning styles of students
11/06/06	Teacher Reflection Multiliteracies (A)	✓		✓			<b>Espoused</b> - Does not explore critical aspects in regards to audience, perspective, purpose and context. All classroom examples in relation to print-based notions (sentences, conjunctions, etc). Endeavours to cater to student diversity. Notions of student deficit evident in comments.
12/06/06	Multiliteracies Reflective Tool Janelle (A)	✓	✓	✓	✓		<b>Espoused</b> – Responses to all aspects of Multiliteracies and Multiliteracies pedagogy.
12/06/06	Email – Teacher Reflection (A)	✓					<b>Espoused</b> – “so much focus is on basic literacy skills at this school”
14/06/06	Learning Object Lesson (FN)	✓					<b>Enacted</b> - Picture this Learning Object – Impetus from previous structured reflection
14/06/06	Learning Object Teacher Reflection (A)	✓					<b>Espoused</b> – Engaging multimodal, non-linear Learning Object. “Couldn’t think of a better way to do an activity like this”
11/08/06	Email – Teacher Reflection	✓					<b>Espoused</b> – Does not discuss type of book, audience etc in relation to online resources. Hasn’t acknowledged online resources as a type of literacy.
14/08/06	Multiliteracies Assessment (TR)	✓					<b>Espoused</b> – Need to incorporate more of a critical literacy aspect. IWB perfect for this due to collaboration and social learning process that would aid students with these skills.

## **How does the Implementation of Interactive Whiteboards Impact on Teachers' Beliefs and Practices at the Teacher Level?**

### ***Tech-savvy***

Of all the members of the Year 4 Professional Learning Team, Janelle was considered to be the most tech-savvy. This was recognised by administrators and she was one of the first teachers to be given an IWB. Her fellow teachers recognised this as she had advanced from using technology to teaching with technology as evident in the professional development in which she engaged. Janelle moved from participating in professional development to facilitating professional development for groups of teachers, both from within her school, as well as in other school and online contexts.

Data collected during Terms 1 and 2 of this second phase of research indicated that Janelle was at the *appropriation* stage of the process as she was integrating new technologies into her teaching practice. She used the IWB effortlessly as a tool to accomplish a variety of tasks in the classroom for both teaching and administrative purposes.

In classroom lessons, Janelle's practice focused on efforts to encourage greater student interaction with the IWB where she taught technological skills to students to physically interact with IWB resources. Students were also observed working with technology for curriculum related tasks. At the *appropriation* stage, Sandholtz et al. (1997) argued that teachers needed professional development on employing alternative pedagogies. In March, Janelle was involved in the *ICT Pedagogical Licence* (Education Queensland, 2006a), training to be a facilitator.

On the 30/03/06 (See Table 5.6), she reflected upon her participation in this training, discussing her beliefs regarding the distinction between ICT as integral to learning and the effective integration of ICTs. Janelle made the following comments regarding her understanding.

Integral to learning: Is it that the learning can't occur without the ICTs? Therefore integrating ICTS's being that learning might still occur without the ICTs but that the ICTs were the preferred way of learning. Integral: How can I plan something that uses ICTs that wouldn't be possible without that component? (Janelle)

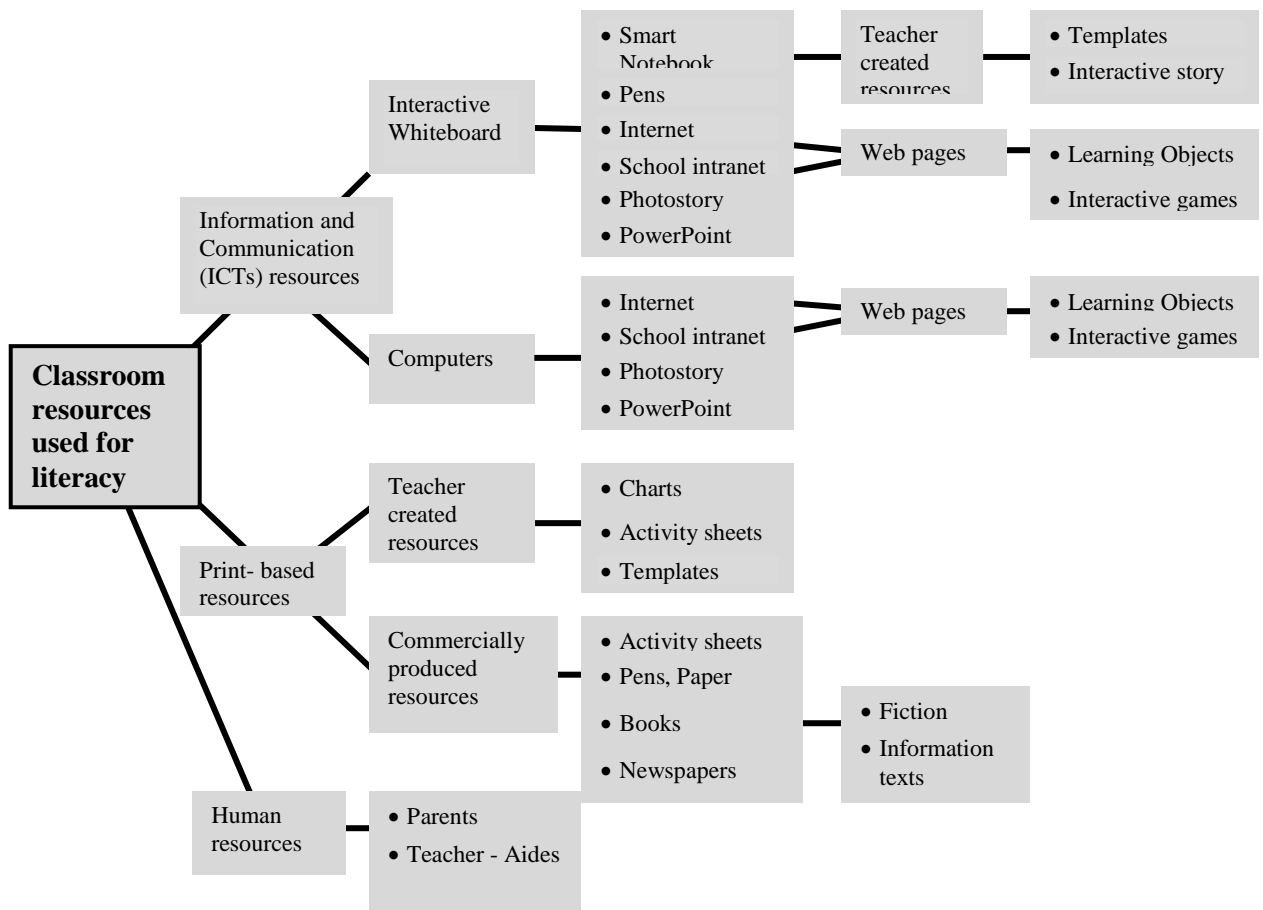
Janelle provided examples such as webcams, data loggers, virtual trips, and learning objects as instances of ICTs as integral to learning. Later on the 12/06/06 she participated in another professional development, the Intel Master Trainer. However, Janelle noted conflicting differences between each provider of the professional development in relation to ICT integration and ICTs as integral to learning.

Intel really focused on only using ICTs if they were the best tool and this seems to be an issue of great debate at the moment. Also, we were restricted by what programs we could use to create our student examples of ICTs. These being Publisher, Word and PowerPoint. Whilst I value all of these, I'd like to think that exemplary practices have moved beyond these programs alone. And that if students are using ICTs in the most effective way, they might be able to choose which program which would best suit their purposes.

Professional development acted as a critical event for Janelle as she tried to sort out her beliefs about the use and value of ICTs in learning. This depth of reflection about student practice with ICTs, along with facilitating school professional development, attending conferences, establishing an Interactive Whiteboard Support Group for schools, and, developing an online mentoring program would classify Janelle as moving towards the *invention* phase.

### ***Day to Day Use***

Janelle integrated the IWB into classroom practice, applying the whole group-small group-whole group teaching strategy within the two hour literacy block. She used a variety of resources and teaching aides during literacy events and these are documented in Figure 5.2. These have been categorised as three clusters: (a) Information Communication Technology (ICT) resources, (b) print-based resources, and (c) human resources. These clusters have been grouped into sub-categories to reveal the range within each of the three clusters. ICT resources were those Janelle and/or her students used on either the IWB or classroom computers. Literacy activities were often introduced on the IWB and later completed by students individually or in small group situations on the IWB or computer. Within both these subcategories (ICTs and IWBs), a range of multimodal resources such as web pages, Learning Objects, interactive games and stories, computer software and teacher-created resources formed the basis of activities. In most cases teacher created resources replicated traditional activities conducted on the blackboard or as a worksheet.



**Figure 5.2. Taxonomy of Classroom Resources Used for Literacy Events**

Print based resources, included in the second cluster in Figure 5.2 consisted of items such as books, newspapers, activity sheets that used written text, supported by some visual images, for readers to construct meaning. Human resources were parents and teacher-aides, who were included in this taxonomy as they were central to achieving Janelle's intended goals when students were working in small group or individual situations. Parent and teacher-aides provided assistance in locating the relevant web-page information for web-based literacy activities and in scaffolding the task.

A systematic analysis of videotaped observations and fieldnotes identified that the IWB was used as a presentation tool, a recording tool, a research tool, and a drawing tool. In most of the literacy events, the IWB served more than one purpose. An audit of events listed in Table 5.6 revealed the main use of the IWB was for presentation.

Janelle espoused the benefits of the IWB on the 02/03/06 as follows:



IWB was great because you could cut and paste text to enlarge for better viewing. IWB enabled students to highlight key words easily and erase if a mistake was made. Whiteboard enabled me to write key words to assist lower level kids. Spotlight feature enabled students to focus on the specific text and not everything on the page.

She believed the flexibility in manipulating text was a valuable tool for teaching students. In her reflections Janelle commented on several occasions there was the need for charts and copies of texts for students. Whilst Janelle valued the IWB it demonstrates her belief that other options needed to be available for learning purposes. On 21/03/06, she reflected that it “Would have been good to have a printed copy of this text as well. Ensure students have access to paper/books as well as using the Smartboard”.

### ***Interactivity***

Earlier notions of interactivity and engagement in Janelle’s teaching practice were mainly physical and technical interactivity with the IWB or other objects, such as texts, or charts they could manipulate. Janelle’s comment on 17/05/06, illustrated her focus on physical interactivity, “Only one student could interact with activity”. In one activity, 16/03/06 where she reflected on how she could ensure greater interactivity, Janelle suggested that she could “involve students more through some sort of interactivity eg. Working with a partner, or giving them a raffle ticket if they answer a question”. Also she emphasised the role of hands on activities as motivating. “Use of chart paper seemed to motivate the students”. However, these notions did not relate to achieving conceptual interactivity with content taught.

Evidence of conceptual interactivity was examined in Janelle’s teaching practice. In reflections Janelle was asked about her teaching practice in relation to questioning. Her reporting described quantity rather than quality of questioning. On 2/03/06 she reflected on her teaching practice stating, “I focused on even distribution between males and females.” Similarly on 16/03/06, she commented, “I tried really hard to evenly distribute questioning and also targeted students who didn’t offer to give answers”. She also noted that to engage students more she should set a purpose for their engagement. She reflected, “Involve students more actively earlier in the process. Explain what will be required earlier of them so they remain attentive”. Reflection on her lessons was an important aspect of growth for Janelle.

Later observation of her practice indicated Janelle tried to develop conceptual interactivity through framing open questions to which students would respond, although most interactions were limited to initiation and response, with little elaboration of responses. This is evident in the transcript of the classroom event explored later in this section. Other opportunities for conceptual interactivity depended on the type of task or text used. For instance, Janelle wanted to embed higher order thinking through a compare and contrast activity on 18/05/06. She reflected:

Higher order thinking (which is what I want) and I'm tired of them doing activities that are literal comprehension or simple regurgitation of facts, I want them to take a step up with their thinking and really apply what they know.

However, this task was challenging for students. Only two of the Year 3 students were able to complete it successfully. This emerged as a learning opportunity for Janelle as she recognised a need to provide support for students for successful completion of tasks. She reflected that, "Perhaps though these skills need to be taught by us first...As comparing is a difficult strategy". When asked why these two students were able to complete the task when so many others had not, Janelle offered, "Mmmm. Perhaps they are more divergent thinkers".

### *Affordances of IWBs*

On 05/04/06, Janelle reflected that the IWB as a resource for social interaction allowed for students to learn through dialogue and peer tutoring, which benefitted particularly students in lower literacy groups.

IWB was also very useful for the low group to complete their activities because it fosters that social dialogue between students and the peer tutoring. I also think that the interactiveness of the phonics activity was very useful for this literacy group, it allowed them to make errors, to see instant successes and failures.

This was evident also in an email (16/03/06) when Janelle reflected:

Photostory – extremely useful for the lower students and literacy skills. "a different medium to show their understanding and knowledge. Last year when I did a Photostory I found that the lower students were able to demonstrate their learning quite effectively with Photostory because it was more 'oral' and 'visual' based.

Janelle's construct of effective learning with the IWB was that it provided hands-on learning (interactivity and manipulation), social dialogue and peer tutoring.

### *Supports and Constraints*

The implementation of IWBs created a new reality for Janelle as she grappled with their resources in teaching and learning of activities. She saw supporting factors centred in the encouragement and support and various provisions made by the school administration. Professional development had helped her particularly progress in her work. Constraining factors also of greatest impact were problems with the IWB, lack of parental help, and use of IWBs for small group work. Janelle found the reality of using this technology was constrained due to several factors she identified as restricting her use of the IWB. She mentioned problems with the IWB, in particular with the digital pen, on several occasions. For example, she indicated that, "the impreciseness of using the pens is really starting to frustrate us all and probably reduced the amount of interactivity of the students". Issues also related to restricted use of the IWB, in particular the "whole class in front of the IWB limits interactivity". There were also issues in using the classroom computers to complete tasks. Janelle, in an informal conversation reported lack of parental assistance as constraining ways of conducting computer-based activities.

For some students, in particular those in the lower literacy groups, working in small group situations with the IWB were problematic. Janelle commented that, "I find that the two lower groups really struggle with turn-taking etc. and even with the basic operation of the board, mainly lower group". This inability to work independently formed part of Janelle's construction around notions of deficit. Other issues such as behavioural issues, and noise arising from an adjoining class, were evident in the critical event explored later in this case study.

### **How Does the Implementation of Interactive Whiteboards Influence What Counts as Multiliteracies at the Teacher Level?**

As Janelle experimented with implementation of IWBs, she sought to explore ways in which she could more effectively integrate IWBs into her curriculum. Her participation in this study with a focus on Multiliteracies was voluntary and part of her

commitment to be a leader in the area of ICT integration with a focus on IWBs. We explored these issues during this period of data collection.

### ***What Counts as Multiliteracies?***

Janelle's definitions of literacy and Multiliteracies shared a similar recognition of multiple forms of literacy with a range of texts to those of her Professional Learning Team members. Whilst she acknowledged the notion of communication in her beliefs about literacy, she did not espouse more traditional aspects of reading and writing, as evident in the school Literacy Plan 2004-2009. Her construct of Multiliteracies included reference to: discrimination between information sources on the Internet, critical literacy, and the creation and oral presentation to a variety of audiences.

All data were explored to determine correspondence with the Cope and Kalantzis (2000) dimensions of multiliterate practices: multimedia and ICTs, semiotic systems, cultural and linguistic diversity, and critical literacy.

### **Multimedia and ICTs**

As identified in Table 5.6, in all events there was either enacted use of, or reference to, multimedia and ICTs. For example, in the Multiliteracies Pedagogical Reflective Tool, Janelle espoused:

My students are constantly engaging in new forms of literacy – primarily digital forms of literacy because of the Smartboard. However, these are not often made explicit. I believe this is critical – and I endeavour to expose my students to a variety of literacy forms – digital, visual, written, multimodal – perhaps not enough attention given to audio.

Observations supported the enacted use of a variety of multimodal texts such as web pages, Learning Objects, interactive games and stories, computer software and teacher-created resources. In spite of Janelle's acknowledgement that she exposes students to a variety of literacy forms, her approach to doing this reflected a traditional print-based notion. Later, on 14/08/06 when reflecting on the results of her students in the Multiliteracies Assessment, she recognised her different teaching approaches when using traditional picture books and multimodal texts. She explained that when using picture books she discussed audience and purpose, yet with multimodal texts she did not. When asked to elaborate, Janelle responded:

I think we tend not to because we haven't fully acknowledged online resources as a type of literacy...which is rather naïve of me I guess...but it is a relatively new literacy that is being utilized in the classroom – and perhaps more and more because of the smartboard.

Janelle used web pages on numerous occasions for whole class activities and small group activities. She believed that students should use web pages for some tasks such as accessing and reading and researching sporting profiles, rather than books as these were the most up to date. She did, however, counter with, “Internet texts: need to question their accuracy, though this is difficult to really do because what text source is accurate. Observation of Janelle’s enacted practice, when using web-pages revealed traditional print-based practice. At times, such as 13/03/06, web pages were cut-and-pastes and adapted as evident in her reflection on the 21/03/06 when she stated that, “Karak the Mascot text (copied from Internet) in ‘kidspeak’ language so they responded well to the corresponding comprehension activity”. In a whole class activity on 01/03/06 Janelle cut and pasted Internet text and photos for a sportsperson, Donald Bradman, into the Smart Notebook software. Teaching practice focussed on developing students’ comprehension of the content of the written text. Janelle reflected on 02/03/06 that it was a “Relevant written text used from the Internet and ‘skimming’ skills appropriate for this mode of text”.

When asked if reading a print text and reading an Internet text required the same approaches, Janelle responded on 13/03/06:

No ... I think Internet text really needs the reader to focus on the specific text, and not everything else on the page. Plus there isn't the turning of the pages, the text is often non-linear in that hyperlinks can take kids to other links etc. They are the same I guess in that they are a series of words, sentences, paragraphs etc. But often the text is organized quite differently. In books text is usually clearly organized under headings or on the page, whereas the Internet restricts the creator of the text to try and fit it all on a page, often smaller fonts, often without clear organisation or headings. Students need to rely more on skimming and scanning skills with the Internet.

Janelle believed that different reading practices were needed when reading print and multimodal texts. However, she struggled to implement this in her lessons. When attempting to locate particular information with web pages as on 21/03/06, students had to navigate through “everything else on the page” and struggled to complete the task. However, Janelle, felt that it was because the “Internet sites were too hard for students”. Whilst she may consider that there are differences in reading

approaches with print-based and Internet texts, 70% of her students in a Home Literacy Survey viewed reading a webpage as the same as reading a book. All students in her class indicated that good book reading skills helps you on the Internet.

On several occasions (See Table 5.7) Janelle commented that she could not find relevant texts for students of this year level and appeared resigned to this. At times she questioned the relevance of what content she could find to students' lives. The structure of other texts, for example, the editing text on 05/04/06 did not allow for students to predict the correct placement of text connectives. Janelle saw these as constraints as she prepared IWB lessons.

**Table 5.7 Analysis of Classroom Event 14/06/06**

<b>Date</b>	<b>Quote</b>	<b>Analysis</b>
02/03/06	Texts somewhat difficult for this year level, though some children could comprehend. Size of text too small for students to read. Perhaps text was not relevant in terms of content.	Text too challenging Readability of text an issue
13/03/06	Text being too difficult – mainly with the vocabulary plus unfamiliar content to the students ie Donald Bradman.	Lack of relevance of content Consideration of vocabulary Consideration of relevance of content
16/03/06	Texts (I think) are targeted at a higher level than perhaps year 4, but this is probably always going to be the case with Internet texts.	Consideration of text level Teacher appears resigned to lack of appropriate texts
05/04/06	American phonics activity didn't have a direct effect as it was on vowels. The text for editing was too challenging as it was difficult to work out where the connectives could be placed, when they did not comprehend the meaning of the sentences.	Text too challenging Structure of text did not allow students to predict placement and make meaning

Janelle also identified on 05/04/06 that she should have “carefully located better resources for them, rather than depend on the ones that were provided in this online activity”. On 21/03/06 students were having difficulty in completing a task which needed them to locate information from a website. “Students doing Internet task had difficulties with the text (unfortunately the parent helper wasn't here for this activity which I had planned for”. Resigned to the fact that she couldn't find Internet texts at her students' levels, her strategy became to recruit parental help. “Can't find enough texts at the students' levels – so I need to improve this aspect I need to recruit more helpers for

my literacy block”. Through all of these experiences, Janelle was building her knowledge about how to problematise and address these issues.

### **Semiotic Systems**

Attention to the semiotic systems is an important aspect for the comprehension and the construction of multimodal texts. Overall, the use of technical language to describe semiotic systems and features of interactive texts was limited. In the Multiliteracies Pedagogical Reflective Tool, Janelle commented that she was “not sure on this one” in relation to semiotic systems. In classroom interaction where she was guiding students to be “whiteboard teachers”, Janelle used language such as “click on this”, “choose that word” rather than using technical language of the Multiliteracies context such as ‘icon’ and ‘hyperlinks’. Only one classroom event on 25 May (Table 5.6) revealed a small amount of discussion about the use of two visual clues in an interactive story book designed to assist the construction of meaning.

### **Cultural and Linguistic Diversity**

Cultural and linguistic diversity was espoused in year level planning documents provided in February and April, 2006, and in three events relating to Janelle. In two of these events, these were espoused views. In the Multiliteracies Pedagogical Reflective tool (12/06/06), Janelle commented that she did consider cultural and linguistic diversity, but notions of student deficit were espoused:

I endeavour to consider the cultural capital that students bring to school, particularly if English is their second language. I probably don’t consider the literacy resources that they bring with them though – to be honest, as I think most of my students have limited literacy resources, therefore I think that it is my job to expose them to other literacy resources.

While Janelle espoused the need to cater for cultural and linguistic diversity she struggled with the everyday realities of technology and literacy, and how to accommodate the diverse needs of her students. Her espousals were not enacted at this stage.

### **Critical Literacy**

While critical literacy as an aspect of Multiliteracies teaching and learning, was identified in year level planning documents in February and April 2006 and mentioned

in Janelle's initial interview when defining Multiliteracies, it remained a new concept that was recognised but not enacted in practice. A focus on critical literacy was not evident in any enacted teaching practice observed. After reflecting on literacy practices of her students in the Multiliteracies Assessment, in an email on the 11/08/06 Janelle considered that, "Need to incorporate more of a critical literacy aspect." She also pondered that the:

IWB is the ideal opportunity to explicitly develop these skills with students. The collaboration and social learning process would also aid students in these skills. We regularly visit the Internet for a specific purpose and this becomes the main focus. Maybe more 'just in time' learning needs to be taking place when using the smartboard.

Janelle could see the potential of IWBs in teaching her students about this but was unsure of how to enact her understanding.

As with year-level findings, data sources allowed for an insight into how Janelle approached her teaching practice. Data were considered for how her teaching practices aligned with Multiliteracies pedagogy (Cope & Kalantzis, 2000).

### ***Multiliteracies Pedagogy***

#### **Situated Practice**

In responding to the Multiliteracies Pedagogical Reflective Tool on 12/06/06, Janelle espoused that she situated teaching practice with students' prior knowledge and experiences:

Where possible, I do try to draw on students' prior knowledge and experiences. Particularly with narratives – I try to get them to identify with some aspect of a story. With non-fictional texts, it is difficult to draw on students' prior experiences and knowledges, though in saying that, I allow for students prior knowledge in notetaking for example.

She indicated that the texts she used were not community-based:

Most of the texts that we seem to use in class are not really 'community' based but rather texts that the students are not exposed to – and I guess I feel that because our students are not really from a 'literate' background, our job is to expose them to other literate practices.



However, Janelle was observed on 21/03/06 using a newspaper in literacy rotations, though she commented that, “students get overwhelmed by wanting to look through the whole paper (skim) rather than read anything indepth”.

### **Overt Instruction**

In discussing overt instruction, in the Multiliteracies Pedagogical Reflective Tool (12/06/06), Janelle’s focus remained centred on print-based texts. She explained that:

I try to ensure that each type of text is covered over a semester - always giving opportunity for writing and speaking. Tend not to allow for formal instruction and assessment of ‘viewing’ or ‘listening’ though probably due to changes in media forms. Over a yearly program, I aim to cover all types of texts, and did so last year. In my last school we always planned (at the beginning of the year) the range of genres we would cover for the year, ensuring a balanced range of the various texts. This school we tend not to do that, probably because our English program is outdated.

This is further supported in the following statement, although she refers to semiotic systems, reflecting a text focus:

I call this the ‘deconstruction’ stage of teaching a genre, and always try to ensure that we deconstruct our texts for the language and semiotic systems through focussed learning episodes. Also during the ‘joint construction’ stage. So for example, we looked at sentences in an information report and how we could turn these into complex sentences using conjunctions.

### **Critical Framing**

Critical framing was not evident in Janelle’s teaching practice. Her espoused belief produced in responses to the Multiliteracies Pedagogical Reflective Tool (12/06/06) revealed its omission. She emphasised, “!!! No – I tend not to do this with year 4 students – why?? I find this difficult to do with year 4 students. I think that the upper school is more conducive to the cultural and social aspects of texts”. Janelle viewed Year 4 students in terms of their capacity to read critically. She emphasised comprehension as her main teaching focus. This was evident in all events observed. For example, on 16/03/06 two profiles of a sportsperson were read to obtain information.

## **Transformed Practice**

Janelle espoused that students applied their literacy skills, knowledge and practices to assessment tasks. She provided this example, stating that:

I think that the information report was an example of where I encouraged students to draw upon available designs and resources. For example, the Problem/Solution paragraphs were linked and informed one another. We also drew upon students' prior experiences with writing an information report, but took it that one step further with the Problem/Solution aspect.

Students were observed doing this on several occasions. They applied their knowledge to the completion of sports profiles, and the preparation of PowerPoint presentations for information reports. Janelle saw the value of the IWB as a presentation resource which students could share their reports to the class.

### ***Critical Event – Espoused Beliefs and Enacted Practice***

In this section one classroom event is examined in detail in order to describe how one teacher's espoused beliefs are enacted into practice. The anchor for an analysis of *what counted as literacy* was a reflection that Janelle recorded in February, 2006 where she espoused that "multiliterate people should be (a) literate with a variety of texts, including print-based and ICT-mediated texts, (b) able to locate and retrieve information in print or digital forms, (c) be critical users (readers) when comprehending texts, and (d) be purposeful composers and designers of digital texts considering audience and purpose".

The classroom event represented here (14 June, 2006, Chain of Events, Table 5.6) is the reading by Janelle and her students of a segment of the Learning Object called, "Picture This" (Learning Federation, 2004). On 11 June 2006 (See Chain of Events, Table 5.6), Janelle reflected on her teaching practice in respect to Multiliteracies. This reflection provided the impetus for this lesson and focussed on an area she self-identified as not enacting in her teaching practice: how texts have different meanings for different people.

Analysis of each of the three texts read from the Learning Object is presented in Table 5.8 to allow for comparison. Aspects of analysis were: espoused beliefs in the second column based on interview data and teacher reflection where the teacher identified her beliefs about teaching practice, texts and their use; enacted practice in the

third column based on video and observation data recording the practices implemented during the teaching sequence.

**Table 5.8 Analysis of Classroom Event 14/06/06**

<b>Reading Event</b>	<b>Espoused Beliefs</b>	<b>Enacted Practice</b>
<i>Snake</i> <b>(poem)</b>	Prior knowledge facilitates comprehension	Prior knowledge acknowledge of rainforest and snake acknowledged as correct but cross-checking with text not explored
	Digital texts require different reading approaches to print-based texts	Contextualising information not taken up
<i>Ace</i> <b>(narrative)</b>	Prior knowledge facilitates comprehension	Contextualising information not taken up  Question/confirmation - Comprehension
	Digital texts require different reading approaches to print-based texts	Reading is word knowledge: focus on question through question/ confirmation Teaching practice focuses on repeating responses. No further references to use of visual images as a reading strategy Reading discourse: point, click on this, choose a word Multiliterate approach taken up for ‘nova’ and ‘vessel’ but not taken up for second page- ‘knuckle’, ‘photon torpedoes’ Reading is located in the text: focus on words
<i>Crocodiles</i> <b>(factual description)</b>	Prior knowledge facilitates comprehension	Question/confirmation - Comprehension
	Digital texts require different reading approaches to print-based texts	Contextualising information not taken up Reading is located in the text: focus on words

All data sources were examined for evidence of espoused beliefs in relation to multiliterate resources and practices. Two beliefs were espoused in Janelle’s reflection: (a) “prior knowledge facilitates comprehension” and (b) “digital texts require different reading approaches to print-based texts.” These are examined in relation to a transcript for each of the three texts from the classroom teaching event.

### **Snake Reading Event**

*Snake*, a poem, was the first text read in this classroom event. As revealed in the transcript in Table 5.9 Janelle directed students to close their eyes and to make a picture in their head while she read the poem to them. After the reading, Janelle

minimised the screen so that students could not see the text. She then asked students to share the “pictures” they made in their minds. Julie (pseudonym) put her wrist to her mouth and pretended to make a biting action and says that “when you go past a snake it goes ppphh” (line 167). Janelle acknowledged Julie’s response. However, Janelle failed to link it back to the purpose of the learning object, i.e. to “make a picture in your head to match the text”. She accepted only correct responses based on students’ prior knowledge as evident in the pictures in their heads (line 161).

**Table 5.9**      **Transcript Excerpt *Snake Poem***

<b>Line</b>		<b>Speech</b>	<b>Gestures, Actions</b>
159	T	Okay. You need to listen now because we are changing the activities slightly. Darren.	Teacher puts her hand up to signal to stop and listen.
160	T	Okay we might look at the snake please. Can you select the snake for us up here.	Teacher looks at options on IWB screen. Tracey selects the snake and a new screen appears.
161	Voice over	See if you can make a picture in your head to match the text. Think about what could be happening just as if it is a movie	
162	T	Ok. I want you to close your eyes first. I am going to read this to you and I want you to make a picture in your mind.	
163	T	The crooked wiggly slithering snake Slides along the grass. The crooked wiggly slithering snake Bites us when we pass.  His jet black eyes Are very bright. In knots he ties Himself at night.  The crooked wiggly slithering snake Slides along the grass. The crooked wiggly slithering snake Bites us when we pass.	There is a thought bubble which says to “select to see pictures in his head. (Teacher doesn’t select this option)
164	T	Open your eyes. Who would like to come out and share what you picture you made in your mind. Julie that would be great.	Teacher gets up and removes text with snake poem on it. Sits back down on chair
165		Guys you need to listen carefully. Mark. Sorry Julie when you are ready.	Julie moves out to the front of the group, beside Tracey at the IWB. Julie puts her wrist to her mouth and pretends to make a biting action.
166		Okay so when what comes past?	
167	Julie	When you go past a snake it goes ppphh	Makes biting action again. Classroom is very noisy. Unsure of whether it is this class or the other adjoining class.

168	T	Excellent thank you. Ok who else would like to share what picture they had in their minds? Megan. You will have to stand up and be really loud.	Teacher looks over to the other class.
169	Megan	A snake slithering	
170	T	A snake slithering. Excellent. Mark.	
171	Mark	I was in the rainforest and saw a snake xxxx	
172	T	And why were you in the rainforest?	
173	Mark	Because snakes live in the rainforest.	
174	T	Excellent. Did the text say. Let's put that text back up. Did the text say anything about a rainforest? Can you click there for it Tracey	Rephrases Speaking to Tracey?  (Teacher doesn't select the thought bubble to see what pictures the person had in their head.)
175	Students	No	
176	T	But that's ok that Mark did that because he is bringing his own meaning to the story when he reads it.	

Later Janelle prompted Mark to share the picture in his head. Mark responded, “I was in the rainforest and saw a snake xxxx” (line 171). Janelle further explored this notion by asking Mark why he was in the rainforest, linking it back to the text, “Did the text say anything about a rainforest?” (line 174). All students confirmed that the word “rainforest” was not in the text with a resounding “no” (line 175). Janelle’s responded that “But that’s ok that Mark did that because he is bringing his own meaning to the story when it reads it.” Whilst Janelle acknowledged Mark’s prior knowledge for bringing meaning to a text, she missed an opportunity in advancing students' strategic reading practices with multimodal texts by not selecting the visual and audio support provided in the “Select to see pictures in his head option” (see Figure 5.3).

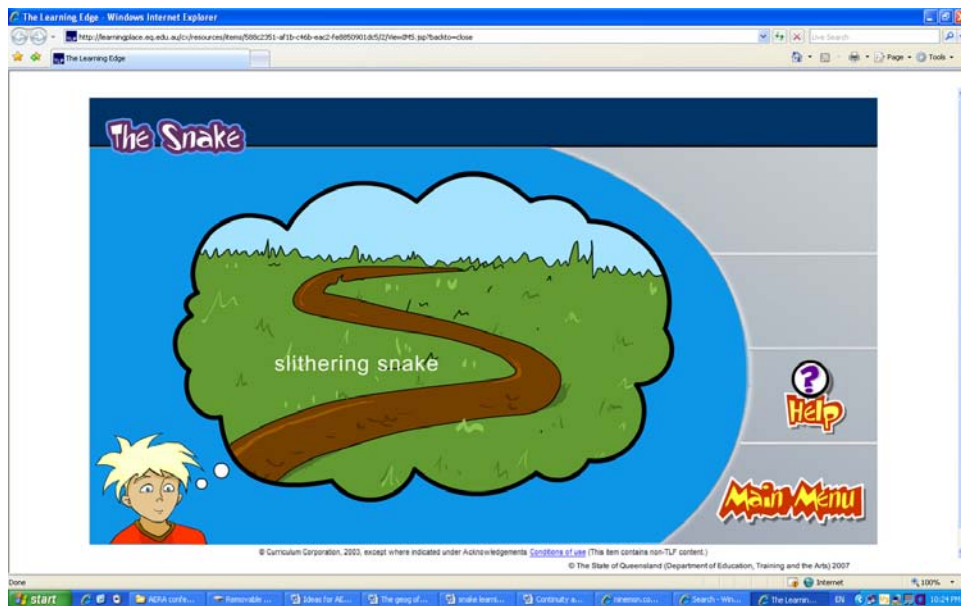


Figure 5.3. Screenshot from *Snake* poem. Select to see the pictures in his head.

Selecting this option would have allowed Mark to cross-check his interpretation of the task, that is, to make a picture in his head of rainforest based on prior knowledge, with knowledge based in the text, a visual of grass. Selection of this option would have explicitly demonstrated to the class the need to base one's interpretation on the actual text and not on one's prior knowledge.

### ***Ace Reading Event***

The next text reading was *Ace*. The transcript excerpt in Table 5.10 included a question Janelle posed that reflects her belief that prior knowledge facilitates comprehension: "So do you think that when you read something and it's about something you like and you know about, do you think it makes it easier to understand what you read?" (Line 227). While Janelle's question indicated her awareness of the relationship between prior knowledge and understanding, this awareness was not evident in her actions when using the Learning Object.

The second espoused theory that digital texts required different reading approaches to print-based texts is evident in Janelle's reflection, where she wrote that a feature of this text was that it was "non-linear". However, the approach evident in the

transcript excerpt was a traditional linear reading, with authority located in the words of the text.

Janelle did not take up contextualising information available in the Learning Object in the form of the story title *Ace*, nor did she follow up the link to find out author details (Figure 5.4). Further, Janelle did not explore the hyperlinks afforded in the text. For example the hyperlink to “tricky words” afforded a potential opportunity to explore the meanings of “knuckle” and “photon torpedoes” (see Figure 5.4 underlined words, signalling a hyperlink) and to gain further information, including a dictionary meaning and audio pronunciation.

**Table 5.10** Transcript Excerpt *Ace* Story

Line		Speech	Gestures, Actions
212	T	So what else can we add to the story now that we have read that little part? What pictures are we forming in our minds?	Teacher points to a student.
213	S	XXXX	
214	T	Fighters	Teacher pauses, then points to another student.
215	S	People disappearing	
216	T	People disappearing. Good girl.	Students speaking in background. Not sure if it is a response or not. Teacher points to a student in a different direction.
217	T	Ok that one's quite a tricky one. Why do you think that one's a bit trickier than the first one?	
218	S	Lasers	
219	T	Laser's good. Good girl. So why is this one trickier than the one we read about the snake?	Teacher points to a student. It is hard to see. I think this may be Leanne (pseudonym) (learning support).
220	S	Because they are different.	
221	T	How are they different?	
222	S	They're different stories.	
223	T	Do you know much about lasers and vessels and spaceships?	
224	Ss	No	
225	T	Do you know much about snakes?	
226	Ss	Yes	
227	T	So do you think that (pauses) when you read something and it's about something you like and you know about do you think it makes it easier to understand what you read?	I can hear students talking. Teacher pause -This may be to gain student attention.
228	Ss	Yes	
229	T	It does, doesn't it? And that is the same with all of us, even as adults.	

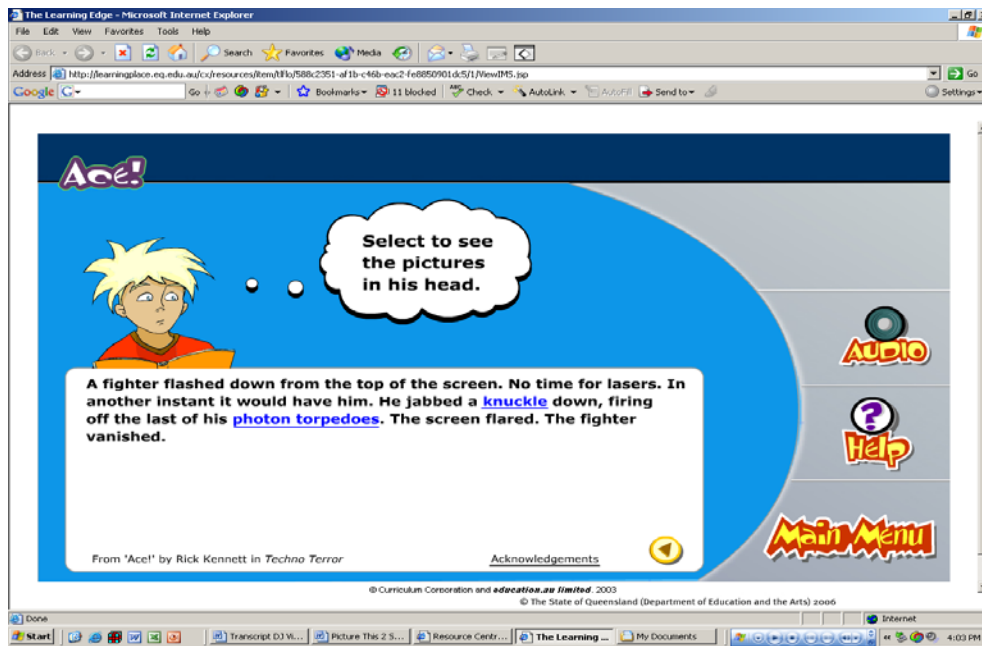


Figure 5.4. Screenshot of *Ace* story, page 2 of 2

Analysis of these links indicated that they provided information designed to assist students in decoding the meaning of this text. However, they were not taken up in the interaction, creating another missed opportunity to bring forward information that could support student understanding. In her reflection, Janelle indicated (lines 217-219) that students did not understand *Ace* because they did not have sufficient prior knowledge of lasers and vessels (line 224). Yet, she provided no attempt to help students gain this information. Only after the lesson, when Janelle had time to reflect on what occurred, did she identify areas of needed knowledge and a missed opportunity to develop students as strategic readers of multimodal texts.

### ***Crocodiles Reading Event***

The final reading event was based on a factual description of crocodiles and a portion of the transcript in Table 5.11 is provided. In examining the espoused theory of prior knowledge facilitating comprehension, Janelle prompted Sally (pseudonym) by asking “what are you thinking when you are reading this?” (line 235).



**Table 5.11 Transcript Excerpt *Crocodiles* Factual Description**

Line		Speech	Gestures, Actions
235		Ok what are you thinking of when you are reading this? Sally?	Tracey hasn't finished reading the piece but teacher presses on.
236	Sally	Frogs	Some students laugh
237	T	Frogs?	Teacher looks at passage on IWB about crocodiles. Pauses
238	Student	xxxxx	
239	T	What makes you think of frogs?	
240	Sally	Cos they're....XXXX	
241	T	Excellent. What do you think the main story is about? What is it mainly about?	Giving a positive evaluation when not main focus of story. What about clueing students into title?
242	Sally	Crocodiles.	
243	T	Crocodiles. So how are crocodiles and frogs related?	
244	Student	Because....	
245	T	No come on stop I want Sally to keep on going.	
246	Sally	Because crocodiles eat frogs	
247	T	Because crocodiles eat frogs	
248		Excellent. What word helped you with that?	
249	Student	Um. XXXX	
250	T	It doesn't actually say that they eat them but it says something else that helps you. Who can help Sally with that word?	
251	Student	Prey	
252	T	Prey. Good girl	Teacher points to word prey.
253		Um Mark?	

Sally, a student with learning difficulties responded with “frogs” which was met by laughter by some students. Janelle attempted to scaffold Sally’s understanding through reference to the text and establishing how crocodiles and frogs are related (line 243). Sally identified that crocodiles eat frogs and refers to the word “prey” in the text (line 252). Whilst one student has an understanding of the term “prey” it is unclear if this is the case with all students in the class. Like Janelle’s reading of *Ace*, the approach to the reading of *Crocodile* was mainly linear, as is the nature of most hypertext, and she selected one option (billabong) to foster students’ understanding.

In this event Janelle, missed an opportunity to enhance students’ understanding through an elaborated discussion of vocabulary. She did not take up an opportunity to model or apply the reading strategy of locating the main idea of the text, through skimming the text and using contextual clues like the title *Crocodiles* (see Figure 5.5).



**Figure 5.5. Screenshot of *Crocodiles* Factual Description**

### *Affordances and Constraints*

In the reading event previously examined, three aspects were identified as either supporting or constraining factors in the reading task observed. These were: (a) procedural and behavioural constraints, (b) utilising meaning-making resources available in the Learning Object, and (c) elaboration of student responses in classroom discussions. The affordances and constraints of this teaching episode in relation to each of the three reading events are documented in Table 5.12. Various behavioural aspects and other disruptive influences, such as students causing distraction and the IWB not working properly were common throughout all three text readings during the classroom event.

**Table 5.12 Affordances and Constraints**

Reading Event	Affordances	Constraints
		Background Noise
<b>Snake (poem)</b>	Select to see pictures in his head option -Image, voice over of snake and grass provided Audio/visual input: Select to see pictures in his head option	Procedural and behavioural aspects interfering with reading task
<b>Ace (narrative)</b>	Picture This front page: Title, author details	Main Menu Access
	Digital Text "Ace"	
	Intertextual link: Tricky Words Audio/visual input: Select to see pictures in his head option Technological discourse: icon, hyperlinks, audio Pop up box prompts reading strategies Help; Main menu	Text box partly covers the text
<b>Crocodiles (factual description)</b>	Title – Crocodile Intertextual link: Tricky Words Audio/visual input: Select to see pictures in his head option Provided reading strategy of skimming but slide of crocodile not accessed by teacher.	

Other supporting and constraining factors, such as not utilising meaning - making resources available in the Learning Object, and lack of elaboration of students' responses in classroom discussions were missed opportunities for developing students' learning.

***Post Script: A new teaching role***

On 27/06/06, Janelle advised that she would no longer be in a teaching position with the Year 4 Professional Learning Team. She had been approached by the Principal at the end of Term 2 to take up a position he described as, "a 21st century role of Master Classroom Teacher." This role was envisioned to be a "blend of traditional library combined with ICT/interactive learning". However, the new Learning Centre which would house the school library would not be ready until late Term 3. In the meantime, Janelle committed to work with the Year 4 Team as much as she could in Term 3, to help with the transition as the new teacher took over her classroom.

In the remainder of the year Janelle's job description varied with her taking on Curriculum Coordinator work, writing grants, working on the school's webpage, and doing non-contact relief for teachers in the school. Janelle also took on a variety of roles, such as giving conference presentations, university lectures, running online mentoring learning courses, and facilitating ICT professional development at both school and regional levels. Changes to the administration staff, in particular the resignation of the Principal in June, 2006 due to family reasons, led to concerns for Janelle in relation to the level of commitment by the school to integrating IWBs. She commented on 16/07/09 that she was worried about the effect of the Principal leaving and a new principal taking over. She commented that, "The Principal (name deleted) had a vision and I wonder whether we will be able to continue his vision" (Janelle). She later revealed further concerns in an email on 28/08/06.

The conference was ok ... a bit depressing actually in seeing what other schools are doing and how motivated they are!!! ... I am feeling a bit despondent in knowing how to motivate our own staff into aiming higher. I am starting an Interactive Whiteboard Support Group for our area, hoping to help others and get others motivated too. I'm feeling quite frustrated that I seem to be absorbing all of these new skills and ideas, and I can't do anything with it – and I am not sure if admin are really interested in what I am doing.

The waning interest in integrating the IWB evident in Janelle's comment was signalled in actual use of the IWB within the school as well. Janelle on her observation during non-contact time commented also that some IWBs were not even switched on for the morning session.

### ***Summary of Teacher Level Findings***

Janelle integrated the IWB using it effortlessly to achieve a variety of tasks in the classroom for both teaching and administrative purposes. Her growth through professional development over the course of the year as documented in her reflections and correspondence suggested that she was moving from the *appropriation* phase towards the *invention* phase. Notions of interactivity with the IWB focussed strongly on physical and technical aspects on a turn-taking basis. Janelle did attempt to promote greater conceptual interactivity for her students. However, classroom discussions followed more traditional interactional patterns of initiation and response, with little

expansion from Janelle to students' initial responses that might have stimulated further enhancement and greater interaction.

As with Phase 1 findings and Year Level findings, Janelle felt that administrators supported her use of the IWB for teaching and learning. However, with changes to staff as the year progressed and her movement from classroom teacher to teacher/librarian, she questioned the durability of this support. Janelle identified issues that constrained her practice such as problems with the IWB, insufficient software on classroom computers, lack of parental support for using the computers for classroom activities and the limited capabilities of students.

Also consistent with Phase 1 findings, Janelle had used multimodal texts and ICTs extensively. However, her approaches to using these types of texts revealed she was working from a print-based notion. Additionally, she did not enact her espoused beliefs about comprehension and strategic reading behaviours with digital multimodal texts. While teaching resources such as learning objects included features designed to enhance reading, these were not taken up, which suggested that Janelle was working from a traditional print-based approach. She was finding her way through the technology to the pedagogy.

The use of a technical language to describe the semiotic systems and features of interactive texts such as learning objects was limited. Whilst endeavouring to consider the cultural and linguistic diversity of her students, Janelle's beliefs espoused notions of student deficit, in that they possessed limited literacy resources. A critical literacy perspective was not enacted in Janelle's classroom as she believed it was not suitable for Year 4. However, she did acknowledge that the IWB was an ideal tool for developing critical literacy skills with students.

Whilst situating her teaching practice with students' prior knowledge, Janelle's view of her students was built around the deficit thinking. Findings suggested a focus on print-based texts in the various accounts provided of Janelle's teaching. She was yet to recognise multimodal texts as a form of literacy in their own right. Observations of Janelle's teaching practice revealed that her students were applying and transforming their knowledge in classroom activities and for task completion.

## Chapter Summary

Data collected in Phase 2 allowed for a detailed exploration of the research questions under study. Findings built upon those from Phase 1 (Chapter 4) and documented the continuing journey of one school community as it sought to implement IWBs into classrooms. They reported also how this implementation shaped constructs of Multiliteracies at the whole school level, at the year level and at the teacher level.

At the whole school level, a broader notion of ICT integration was espoused by the Principal. He sought to extend the notion of student engagement that is highly evident in Phase 1 data, to a more effective whole school pedagogical approach that considered three aspects as supportive to IWB integration: technical, practical and critical. Professional development engaged in by some teachers supported this focus. However, the Principal retired in June, 2006 and along with other staff changes there was a dislocation in the effort to enact the initial vision.

As well as these human factor constraints on enactment, technological issues remained a constraint for some. The loss of their computer laboratory during the construction of the Community Learning Centre challenged the completion of ICT related tasks for students as identified in Year Level data. The case study of Janelle revealed additional supporting and constraining influences such as: (a) contextual factors including behaviour and noise, (b) missed opportunities in relation to technology and classroom interaction, and (c) limited resources and abilities of students. Teachers were grappling with technology as they adapted it to their existing teaching patterns.

Constructs of Multiliteracies were not visible in Whole School data. Rather, they present a print-based view of literacy, with a focus on reading and writing. In the analysis of school meetings the focus was on lifting student achievements in relation to literacy aspects. Data analysis applied to activities during dedicated blocks of literacy instruction. Phase 1 findings in relation to the Multiliteracies framework supported Phase 2 findings at the Whole School level. The use of multimedia and ICTs was evident, but little evidence was found in relation to semiotic systems, cultural and linguistic diversity, and critical literacy being constructed in teachers' practice. Findings at the Whole School level were also reflected in Janelle's practice. However, her role and level of teaching participation changed at the end of Term 2 and it is difficult to gauge if the nature of this reflection may have been different had she continued as data

analysed in Term 4 at the Professional Learning Team level indicated a greater focus on semiotic systems and critical literacy.

In Chapter 6, findings from Chapter 4 and Chapter 5 are discussed critically in light of the literature reviewed. The contribution this study makes to new knowledge is appraised and the implications for schools, classroom teachers, educators and researchers in the fields of Multiliteracies and technology integration discussed

## CHAPTER 6

### DISCUSSION

In this chapter results reported in Chapters 4 and 5 are discussed critically and the contribution this research makes to practice and new knowledge is evaluated. This discussion is structured around the two key questions of the study which were:

1. *How are teachers' beliefs and practices shaped by the implementation of Interactive Whiteboards?*
2. *How does the implementation of Interactive Whiteboards influence what counts as Multiliteracies?*

This discussion theorises findings in relation to existing literature in three areas that were highly significant in my choice of topic and in designing key elements of the two research questions. The first of these is what is generally known of the integration of technology and its impact on teachers' beliefs and practices. The second is specific to the implementation of IWBs into schools, and the third is about Multiliteracies. Both the IWB Implementation Grid (Kitson, 2009) and the TPACK model (Mishra & Koehler, 2006) will be used to show relationships between findings from this study and results identified in a review of the literature. The study's findings are contextualised in one school site and draw on shared and individual experiences within that site. To the extent that readers identify similarities between this context and their own, they provide generalisable propositions about how change is manifested and managed in an educational setting.



## **How are Teachers' Beliefs and Practices Shaped by the Implementation of Interactive Whiteboards?**

Six main findings helped me to construct an answer to this question within the limitations of the study. First, school leadership played a central role in shaping and supporting teachers' beliefs and practices. Second, strategic planning for success by school leaders during the early implementation of the school's IWBs Project had longer term benefits for managing progression in teacher practice. Third, contextual factors from within and outside the school had potential to shape and redirect priorities and minimise changes in teachers' beliefs and practices. Fourth, teachers brought traditional teaching practices into their teaching with IWBs. Fifth, teachers' beliefs about their traditional teaching roles and responsibilities were shaped by the interactivity of the IWB. Sixth, professional development, delivered or prospective, emerged in teachers' views as an important shaper of their practice.

The relation of each of these key findings to the research question and implications of this relation are discussed in the sections that follow.

### ***Finding 1: School leadership played a central role in shaping and supporting teachers' beliefs and practices.***

The decision by the school's principal and two deputy-principals to fund IWBs for as many classrooms as possible shifted the teaching and learning priorities of the school. Kent's (2008) statement, "It is not just the teacher, it is the school" (p.12) captures the significance of big-picture thinking and enactment that was on hand in the study site. In this school, all five features that Kent (2003; 2008) had said were needed for an effective implementation of IWBs were evident. The school's leaders were committed; they initiated the big picture and worked to have it take shape. There were multiple IWBs and teachers to use them. This provided a basis for talk amongst peers about what they were trying, what had worked and what hadn't – the professional reflections and sharing that were needed to strengthen and develop early enthusiasm and skills. The IWBs were permanently fixed, allowing teacher and students access to their IWB for the majority of the teaching-learning time in the school-day without time-consuming and disruptive furniture rearranging. There was time made for sharing and

reflecting as teachers shared their successes and challenges. Finally, each IWB was supplemented with a variety of digital resources such as a scanner, digital camera and access to the Internet. Further, the leaders timetabled opportunities for teachers to reflect and share and to develop ideas as they experimented with a variety of digital resources.

During Phase 1 until mid-Phase 2, teachers reported that encouragement was tangible from the school's administrative team to integrate IWBs into the school's curriculum. This reflects findings by Hayes (2007) and Hayes & Harriman (2001) in relation to successful ICT integration and the "powerful effect" of school leaders who provided a supportive school culture and were actively engaged in the process of integrating the new resource. Glover and Miller (2004) would describe the administrative team of this school as 'revolutionaries' or 'missioners', who constitute a recognisable feature in the leadership of change in this school. Being able to identify the key players in the impetus for change offers other schools valuable information about the ingredients to realise change for a digital school. However, Glover and Miller (2003) in their research do not talk about sustainability of change. They do not indicate how patterns of change are affected when "placeholder" principals take over, once 'revolutionary' principals have left the scene as happened in this school site. This research has contributed to understandings about the effects of such occurrences on managing and planning for sustained change in digital schools and its effects on teachers and schools.

***Finding 2: Strategic planning for success by school leaders during the early implementation of the school's IWBs Project had benefits for managing progression in teacher practice***

From earliest days the administrative team introduced processes and conditions aimed at successfully enacting progressive stages of the implementation. Once again, this strategic planning revealed the determination of planning for change shown by 'revolutionaries' in Glover and Miller's (2003) study. Whilst Glover and Miller (2003) also indicated that revolutionaries tend to instigate what they want with little collegiality, this was not the case with this school. Rather it revealed a real team approach to IWB implementation. Teachers and the administrative team collaboratively identified ways forward with IWBs, an observation more consistent with Hayes and

Harriman's (2001) suggestion that a vision and a collaborative, whole of school approach will encourage teachers' ownership and support in the process.

The school administration's decision to select teachers who as *early adopters* would lead the way was particularly effective. They brought into being a selection process through which interested teachers wrote submissions to justify their choice as early adopters and to have earliest-available IWBs installed in their classroom. All submissions were then considered by the Principal. What resulted was the selection of '*early adopters*' or '*missioners*' who were committed, motivated and had been thinking about how the technology might be deployed. This signified the value placed on IWBs by the school administrative team. These early adopters' development and sharing of what to do and how to do it, allowed for construction of a general fund of knowledge from which other staff drew confidence and early know-how about teaching with IWBs. This outcome is consistent with another of Glover & Miller's (2004) research outcomes that a critical mass of 'missioner' teachers through the power of peer persuasion can have a considerable effect on IWB implementation. They found that the pace of change accelerated with a mass of missioner teachers regardless of the attitude of the school leader. Glover and Miller (2003) found also that in primary schools one convinced missioner had been sufficient to prompt change, regardless of the type of school leader. However, the findings from this study would suggest that one missioner teacher (Janelle), was not enough to sustain an IWB initiative with out the support of school leadership. Janelle, the key missioner teacher in this school became increasingly despondent after the 'revolutionary' Principal resigned. Glover and Miller's (2004) findings appear highly significant in that the 'interplay between leadership and classroom teachers is the force that conditions the pace, extent and impact of change" (p.9). In this school a change in leadership resulted in this interplay falling apart after the change in leadership. It would appear that initial strategic planning was founded on assumptions about longevity of the initial leadership.

The administrative team also established an Interactive Learning Environment Committee (ILE) to foresee and plan for effective integration of IWBs as resources became available. Whilst this committee was effective in anticipating some aspects of change and resourcing needed at the whole-school level, it had yet to filter down to the classroom level to address all issues identified by teachers as constraining to their daily practice. Issues of IWB board not working properly were addressed. However, other

practical problems experienced within the double teaching spaces, related to sharing, in particular noise, distraction, and the inability of students to see the IWB from their desks were not. Some of these constraints may be specific to the classrooms of this school, however, placement of IWB boards has the potential implication to minimise student learning if not addressed. Schools need to develop practical solutions to address these learning issues.

***Finding 3: Contextual factors from within and outside the school had potential to shape and redirect priorities and minimise changes in teachers' beliefs and practices.***

While the roll-out of IWBs was generally staged and anticipated, not all went to plan. For example, early momentum that had built was disrupted in major ways when the innovation from the school to provide a learning hub for the community was brought onto line. The large-scale construction of a Learning Centre to serve as the hub intruded into the school's systematic provision of IWBs to its teachers in a way intended to build their confidence with the technology. Heavy machinery, dust, noise, lack of computer facilities to cater to whole class teaching, and long periods when physical access and/or power was unavailable in various sections of the school all became large parts of the physical environment. They encroached on the social and educational environments and in doing so caused the momentum of the IWB initiative to falter.

On a second front, staff mobility and retirement affected momentum. Critically, with key people removed from the project, teachers such as Janelle felt anxious and vulnerable. Some reverted to negativism; some teachers no longer continued their involvement with IWBs. Others did, but coordination and motivation had lapsed. No transition policy had been created to preempt prolonged uncertainty amongst staff, or to guide teachers toward an educationally-oriented accommodation of large-scale predicaments such as these.

On a whole-school level the change in leadership resulted in a different priority for the collective effort of the school as an educational community. Specifically, the school now moved to the goal of improving literacy and numeracy outcomes as measured by students' performances in national assessment tests. The shift could and should have built on the IWB initiative, rather than replacing it. Whilst the

administrative team had provided a very visible infrastructure for implementing IWBS, it was not comprehensive enough to promote the technology and the allied skills and interest in continued professional development of teachers as a front-line vehicle for any teaching-learning endeavour.

***Finding 4: Teachers brought traditional teaching practices into their teaching with IWBS.***

When teachers first implemented IWBS into their classrooms they relied on their traditional teaching practices to guide what they did pedagogically. Some adapted them slightly in recognition of the IWB learning context. However, as Sandholtz, Ringstaff & Dwyer (1997) found in their research, time was a factor in achieving this across all staff. The Professional Learning Team had developed to the *adoption* stage. Generally, they had adopted the new technologies into their practice by the end of Phase 1. As evident in Sandholtz et al's (1997) model of ICT integration, replication of practice is part of teachers' development in integrating IWBS into their teaching practice.

By end of Phase 2, some teachers had progressed to an *appropriation* stage of the process, where they had mastered a range of software packages See Table 6.1. Professional development that had been undertaken by teachers had fostered this process. In this stage most teachers such as those in the Year 4 Professional Learning Team were able to use the software and hardware associated with the IWB effortlessly for both teaching and administrative purposes.

Key teachers, such as Janelle, had progressed to the *invention* stage by the end of Phase 2. She had started to mentor colleagues, and to create support systems outside the school network using email and the Internet. These initiatives were based on her own role as a 'missioner' teacher. For schools, this developmental continuum of technology integration exemplified by some teachers in the Year 4 Professional Learning Team illustrates how teachers moved across *appropriation* to *invention* in their practices.

**Table 6.1 IWB Implementation Grid (Kitson, 2009)**

<b>End of Early Implementation</b>					
<b>End of Phase 1</b>					
<b>End of Phase 2</b>					
➔					<b>Preferred Future</b>
<b>Measurement Categories</b>	<b>Stage 1: Uncertainty/Not evident</b>	<b>Stage 2: Awakening</b>	<b>Stage 3: Enlightenment</b>	<b>Stage 4: Wisdom</b>	<b>Stage 5: Certainty/ Embedded or Evident</b>
<b>Leadership and Management</b>  Based on Kent (2003, 2008)	A few IWBs are featured in the school, however, there is lack of interest and support from school leadership to integrate ICTs into classrooms	Further IWBs are purchased, which are fixed within key classrooms. There is some sharing amongst teachers from these key classrooms. School leadership – starts to manage best ways to store teacher developed resources and tackle technical issues.	School has multiple fixed IWBs in the majority of classrooms. School leadership is forward thinking in relation to problem solving for technical and organisational issues of IWB integration.	<b>END OF PHASE 1</b>  There is active interest and support from school leadership to have multiple fixed IWBs in classrooms. Establishment of school committee which focuses on improved technical and organisational support and improved pedagogy. Staff has some access to a greater variety of digital resources and dedicated time for team sharing and planning.	Schools have multiple fixed IWBs in classrooms and these are updated and maintained. School leadership supports the school committee in funding new initiatives. The school committee explores and purchases new software packages for different purposes. Teaching and assessment are explored for best ways to achieve improved student outcomes.
<b>Professional Development</b>  Based on Sandholtz et al., 1997)	Little in the way of professional development is offered to teachers as they try to implement IWBs into their classrooms.	Training in operating IWB technology and basic software packages – Smart Notebook, PowerPoint, Word. Need for sharing and collaboration with peers. Teachers experiment with software.	Peer Observation and team teaching. Training in a greater variety of software packages to foster greater productivity. Alternative pedagogies should be encouraged.	Teachers undertake professional development on employing alternative pedagogies. Also there is a focus on a greater use of a variety of digital resources to support teaching and learning.	Professional development moves to a focus on using IWBs effectively in content areas. Teachers present at conferences - showcasing of teacher work. Writing and publishing of findings. Creation of support systems outside the school network. Mentoring of colleagues.
<b>Integration of IWBs into the curriculum</b>  Based on Sandholtz et al., 1997	Entry stage. Teachers are reluctant to try new things, reverting to traditional teaching methods. Teachers may experience problems with technical issues or the resources.	Adoption stage. A greater effort to integrate technology into daily lessons, but activity choice is limited to replicating existing teaching practice using technology.	Adaptation stage. A greater variety of software packages are starting to be used as time-saving tools. Teachers move beyond use for teaching purposes to classroom management and planning.	Appropriation stage. IWBs are used effortlessly as a tool to accomplish tasks. Greater student interaction, with students working with technology for curriculum related tasks.	Invention. Teachers experiment with pedagogical styles and interactions with students. Students actively construct knowledge, with student experts assisting teacher and peers with technological problems. Reflective teaching practice
<b>Construction of Interactive Learning Environments</b>	Learning environment created with IWB replicates existing instructional	<b>END OF EARLY IMPLEMENTATION PHASE</b>	Engagement with IWBs is still focused on turn-taking and surface engagement with flashy	Engagement with educational content focuses on deeper understanding of the subject matter	The learning environment is engaging and motivating. It moves beyond pragmatic uses to critical

	discourse. Interaction is teacher centred.	Engagement with IWBS is at the technical and practical levels of use. Motivation and interaction is defined in terms of physical manipulation of IWB and turn-taking.	features of multimedia. Teachers start to select IWB resources which promote higher order thinking.	and involves substantive conversations.	and intellectual engagement with the subject matter, with knowledge viewed as problematic and open to multiple interpretations.
<b>Understanding of Multiliterate practices</b>	No understanding of the changing contexts of literacy – literacy as a social practice.	Literacy as social practice. Acknowledgement that literacy is learned through Primary and Secondary Discourses. There is valuing of student diversity at the individual level. There is inclusion of multimodal texts and some attention to the different semiotic systems they use.	Teachers conduct audits of students' literacy resources. Deficit notions inform teachers' understandings of students' capabilities. Greater access to and use of new forms of literacy (multimodal texts) in a range of contexts. Some explicit teaching in relation to the meaning-making of the various semiotic systems. Some awareness on the selection and manipulation of resources to convey meanings to influence the reader.	Valuing of the diversity of student's experiences and backgrounds at the collective level is evident in teaching. There is explicit teaching of semiotic systems of meaning making, using a metalanguage to describe. Greater attention to the selection and manipulation of content to influence the reader.	Teaching incorporates all aspects of multiliterate practices - Multimedia and ICTs, Semiotic systems, Critical literacy, and cultural and linguistic diversity. This is embedded in real life contexts using a range of authentic texts. Focus on literacy demands of curriculum areas.
<b>Understanding about multimodal texts</b>  <b>Source: Literate Futures</b>	Understandings about texts are based on print-based notions.	Meanings are actively constructed between readers and texts. Texts are consciously constructed and have particular social, cultural, political and economic purposes.	A text may have several meanings. Texts as sites of a range of semiotic systems. Texts are multimodal, interactive and non-linear.	Texts continue to change, with the creation of hybrid texts which may serve more than one purpose. Notions of intertextuality in texts are explored.	Texts evolve and become increasingly hybrid and intertextual, combining and recombining technologies in different ways. Society and technology changes and texts reflect these changes.
<b>Understanding of Multiliteracies Pedagogy</b>	There is no understanding of Multiliteracies pedagogy (Situating Practice, Overt Instruction, Critical Framing, Transformed Practice)	There is minimal understanding of Multiliteracies pedagogy but it is not evident in teaching practice.	There is understanding of Multiliteracies pedagogy and it is starting to inform teaching practice.	There is greater evidence of application of Multiliteracies pedagogy in planning and teaching practice, with some active reflection occurring.	All aspects of Multiliteracies pedagogy are completely embedded in teaching practice. Planning and teaching practice is informed by reflection and the collection and analysis of evidence.

The implication of this finding is that teachers need a model of technology integration which acknowledges and encourages them to take up the affordances of the IWB technology. This means acknowledging the complex realities of engaging with the multimodal texts on offer with the IWB technology. Further, it needs to acknowledge a pedagogy that is consistent with best practice in literacy teaching. Models of technology integration such as Sandholtz, Ringstaff and Dwyer's (1997) typically promote constructivist approaches to learning. Students construct their own knowledge with the facilitation of a teacher. However, based on evidence-based research constructivism may not be the best pedagogical approach where literacy learning is concerned (DEST, 2005). Rather, the National Inquiry into Teaching of Literacy (DEST, 2005) called for systematic, direct and explicit instruction in relation to aspects of literacy. In this research there appears to be a need for both approaches if students are to develop the literacy skills needed to succeed in multimodal environments and to progress to constructing new knowledge based on these skills. This is supported by Cope and Kalantzis (2000) in their Multiliteracies pedagogy. In their model the first key component is to situate practice or to immerse students. This is where teachers guide a community of learners to construct their own knowledge on topics under study. However, Cope and Kalantzis (2000) suggested that *Situated Practice* is not sufficient as it does not necessarily lead to "conscious control and awareness of what one knows and does" (p.32). They, too, call for *Overt Instruction* that would allow students to gain explicit information about texts.

***Finding 5: Teachers' beliefs about their traditional teaching roles and responsibilities were shaped by their definitions of interactivity***

As with findings from Moss et al (2007), teachers conceptualised interactivity in different ways, with this variation impacting upon their pedagogy and their view of the role students take up in this process. Teachers' notions of interactivity evolved throughout this research and some progressed from an understanding of interactivity as a physical and technical 'doing' activity to a learning-oriented, conceptual interaction that emphasised understanding of content matter. Whilst teachers believed that the IWB afforded opportunities to support student learning, they did not adjust their teaching practices to focus on the affordances and constraints of different modes in operation in the multimodal texts they used.



Dwyer (2001) emphasised that unless technology is used in a transformative manner, it is at best teaching students minimal computer skills. Findings from this study support Dwyer's contention. Teachers in this study felt that there was retention of technological skills through their modeling and students' physical and technical interactions with IWBs. It is important to understand what is implied when using such terms as learning as being transformative or enhanced. Hayes and Yates (2002) noted that defining these terms is more complex in light of changing notions of what counts as knowledge and performance in contexts mediated by technology. Some authors have based enhanced learning around notions of conceptual interactivity.

Observations of Janelle's teaching illustrate the difficulties that some staff were having in mastering this complexity and stretch the understanding of "interactivity" offered by Moss et al., (2007 who had observed that interactivity in classrooms typically reflects the complex mix of content areas and topics, teachers' personal theories of teaching and learning, students' abilities, and available resources. For example, Janelle's comment indicates the challenge she found in making some topics more interactive: "Like in maths at the moment we are teaching mental strategies and I am finding it hard to find a good interactive way to use the Smartboard with that" (Yr 4: Line 30). This suggests that Janelle sees interactivity in this instance as embracing herself and her use of the instrument, a premeditation that is framing her own composition process as she struggles to imagine what "good interactive way to use" might be.

In light of literacy and literacy pedagogy, transformation of knowledge from the Multiliteracies viewpoint entails both transformation of the knowledge students have engaged in or the personal transformation of students as learners. However, to engender transformative practices, students need access to both *Overt Instruction* and *Critical Framing* in relation to the multimodal texts they engage in (Cope & Kalantzis, 2000). Students first need to be able to comprehend these texts to access the knowledge or view of the world inherent in these texts. This is not just specific to texts used in literacy blocks, but is linked to considerations of literacy in multiple content areas, referred to as curriculum literacies (Department of Education and the Arts, 2006; Unsworth, 2001). This study revealed that students did not have knowledge of specialised text and language structures, in particular in relation to multimodal texts that

would allow them to ‘crack’ the codes or meaning systems of the multimodal texts engaged in.

These practices or opportunities offered by teachers clearly have implications for teaching practice. Teachers need to progress their teaching by understanding the nature of interactivity offered by the IWB and how this shapes their pedagogical practice. Schools need to ensure that teachers move beyond a focus on the physical and technical features of the IWB to enhanced conceptual activity. In the area of literacy, this would entail the aligning of teachers’ personal theories of teaching and learning with literacy topics and resources. It would also mean that teachers need to provide pedagogical opportunities to allow for the transformation of knowledge. Further, the use of “missioner” mentors in the literacy content area, with knowledge of how to enact such pedagogical opportunities may hasten this process.

***Finding 6: Professional development emerged in teachers’ views as an important shaper of their practice.***

Teachers identified professional development as a factor to support and advance their practice. Initial Professional Development had focused on technological skills - on how to use an IWB and software associated with it. Once implemented, IWBs shaped teachers’ beliefs as they moved beyond getting the resource to work, to recognising the potential of the technology to rethinking how they taught. Teachers became enthusiastic users of IWBs.

As with findings by Shuck and Kearney (2007, p.60), there was evidence of a “culture of sharing” within the Professional Learning Teams. Timing and the type of professional development were central to this finding. As teachers became familiar with IWBs, they began to consider a need for changes to their conventional pedagogy. In Phase 2 most teachers engaged in professional development aimed at “promoting problem solving, critical thinking and collaboration skills among students” (<http://www.intel.com/education/teach>) which incorporated ICTs to engage students and achieve learning outcomes. This particular professional development viewed ICTs such as IWBs as tools to integrate curriculum areas. This professional development was not central to the teaching of literacy and was not helpful for the effective use of multimodal resources in classroom. Consistent with findings from Mishra and Koehler (2006) and

their TPACK model, teachers need to have content knowledge or, in this case, literacy knowledge to engage with the new array of multimodal texts offered by IWBs.

Beyond these confirmations of existing literature, the implication of this finding is that school leadership needs to provide staff with timely and necessary ongoing professional development. Further, this professional development needs to move beyond the teaching of technological skills to cater to the development of literacy content knowledge and how to teach it (DEST, 2005; Koehler & Mishra, 2008; Higgins & Moseley, 2001). This needs to be embedded within a comprehensive whole-school approach to the teaching of literacy (DEST, 2005.)

### **How Does the Implementation of Interactive Whiteboards Influence What Counts as Multiliteracies?**

There were four main findings in response to the second question of the study. First, the implementation of IWBs, along with access to multimodal texts, meant educators at the school needed to rethink *literacy* as *Multiliteracies*, and to take a multiliterate approach in their teaching tasks. Second, Multiliteracies was an evolving concept where approaches to literacy at both whole-school and teacher level reflected print-based notions. Third, teachers' Technological Pedagogical Content Knowledge (TPACK) was grounded in their experiences of print-based texts. Fourth, some teachers worked from a deficit view of learning making judgements about their students as learners based on incorrect assumptions and beliefs.

These findings and their implications are elaborated in the sections that follow. Recommendations for practice are also provided.

***Finding 1: The implementation of the IWBs influenced the administrative team and classroom teachers to rethink their approach to literacy.***

As the school started to embed IWB into their curriculum, the administrative team and classroom teachers started to rethink their approaches to literacy teaching. The IWB allowed access to a variety of multimodal texts. The administrative team identified a focus on Multiliteracies as a whole-school priority early in the study. Whilst this focus was not achieved by the end of this research, teachers' awareness of the need to rethink

their teaching approaches was increased. Some teachers attempted to include aspects of multiliterate practice. In particular the use of multimedia and ICTS was highly evident. However, results suggested that teachers were focused on addressing fundamental issues of use and that the more complex concept of Multiliteracies and its pedagogical implications were not addressed.

***Finding 2: Multiliteracies was an evolving concept***

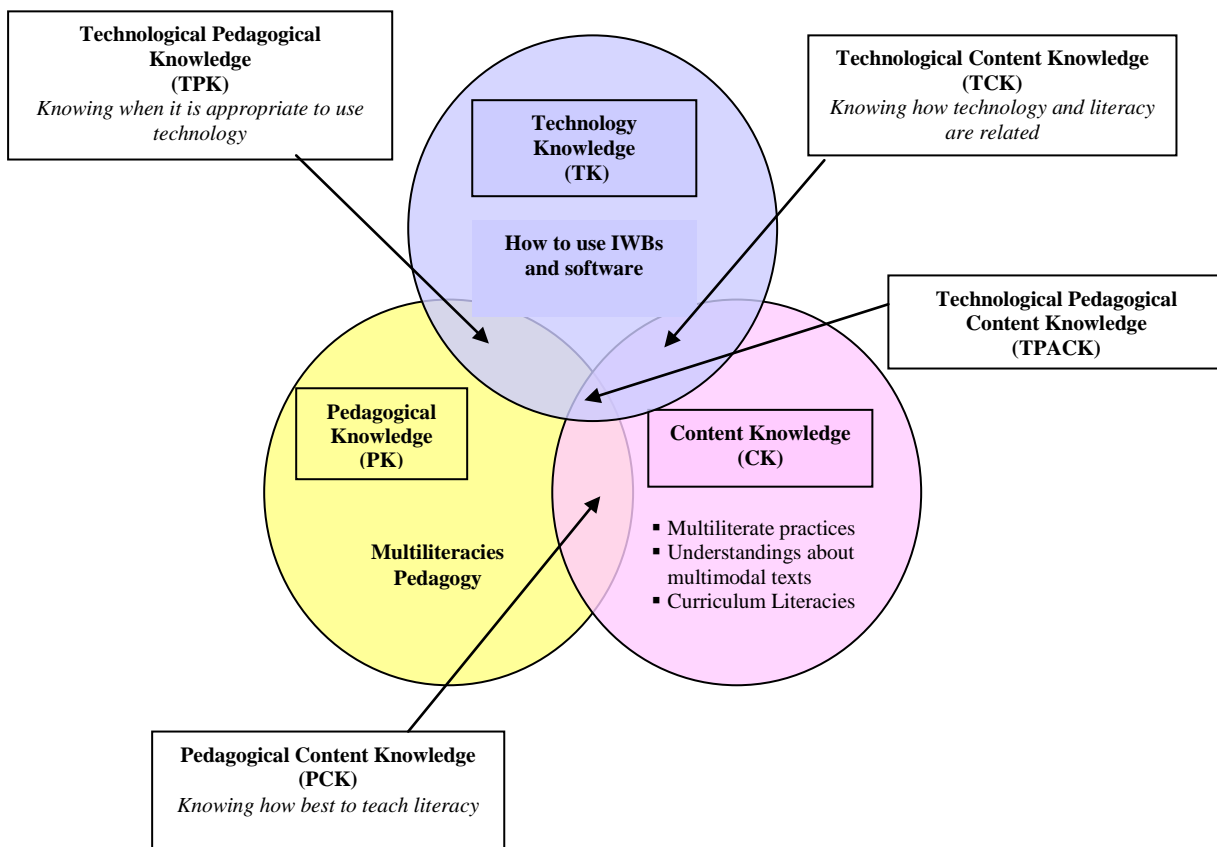
The second finding in relation to this question was that Multiliteracies was an evolving concept. Whole-school documents espoused a notion of literacy as constructed around print-based texts. They did not reflect the changing teaching contexts of the technology rich classrooms. The Administrative team espoused the need to cater to a Multiliteracies approach, but a movement to enact this in whole-school documents was started but not completed by the end of this study.

Neville (2005) stated that “the meaning many teachers make of Multiliteracies depends largely on their previous professional learning experiences, the reflective connections they make with the theory and how they have taught literacy, or how they have been taught to teach literacy, in the past” (p.231). Classroom teachers in this study struggled to transform print-based literacy teaching to their ‘espoused’ multiliterate practices. A print-based approach to literacy teaching endured throughout both phases of the study. The IWBs changed teachers’ beliefs about a need to teach for Multiliteracies, but not about how they understood their students as learners in this multimodal context. As consistent with findings of Trumball (1987), teachers’ abilities to find pedagogical solutions to using IWBs and multimodal texts in new ways was constrained by teachers’ views of how students learn.

The implication of these first two findings is that the implementation of any new technology changes the nature of literacy. Rather, than letting the technology lead the way, school leadership needs to anticipate how such technologies may impact and put in place initiatives to support teachers in their practice. This needs to be reflected in whole-school documents such as literacy plans, and in professional development provided by school leadership.

**Finding 3: Teachers' Technological Pedagogical Content Knowledge (TPACK) was grounded in their experiences of print-based texts. Some of these knowledges were not evident or developed over time through a process of reflection upon espoused and enacted practice.**

As teachers engaged with IWBs and multimodal texts, they did not have the complex forms of knowledge and their intersections required for Technological Pedagogical Content Knowledge (TPACK, Mishra and Koehler, 2006). See Figure 6.1.



**Figure 6.1. TPACK Model (Mishra & Koehler, 2006)**

For example, Teachers' *Content Knowledge (CK)* about how to teach multimodal texts developed over the course of study. Findings from both phases of this study indicated that teachers had limited understanding about the nature of multimodal texts that was relatively enduring. Even where understanding was indicated it was not always transacted into explicit teaching. Teachers in Phase 1 indicated they considered

the purpose of texts and that meanings made in texts are influenced by a reader's prior knowledge and experience. These are important knowledges. However, there are other key understandings, too, and for most teachers, these came into their conscious talk and action only after active reflection with the Multiliteracies Pedagogical Reflective Tool in Phase 2.

These included knowledge that a text may have several possible meanings, or that texts are constructed from a variety of semiotic systems, or that texts can be multimodal and interactive, or, that texts will continue to change as contexts, purposes and knowledges change. This tool provided descriptions and examples of these understandings; however, it used academic terms such as 'semiotic systems' which teachers may not have been familiar with. This may have impacted upon their ability to respond with some teachers indicating they were unsure. Reflective tools such as this one, professional development and readings exemplifying practical examples of a Multiliteracies approach are important to teachers developing these understandings as one teacher suggested, "I think I'm not explicitly aware of what I know"( PLT 2: Email 21 06 06).

Consistent with findings from Unsworth (2002), traditional print-based literacies maintained a role was that complementary, with teachers co-opting and adapting traditional literacy practices to the changing textual environments offered by IWBs. This was a trend throughout all three levels of investigation in this study. Whilst Unsworth's contention was apparent in the early uptake of IWBs, as the study progressed this approach was not sufficient for teachers to consider the multimodality of texts that were engaged with in classroom settings. A Multiliteracies approach requires that teachers embrace both the semiotic systems that multimodal texts employ and the fundamentals of critical literacy in order to interpret and construct multimodal texts in critical ways. Over the course of the study two teachers from the Year 4 Professional Learning Team began to develop this approach - at least at an espousal level. Janelle's uncertainty about the suitability of using a critical literacy approach for students in Year 4 limited both her view of learning and what she enacted when using multimodal texts.

Teachers' *Pedagogic Content Knowledge* (PCK) for teaching also developed over time and through a process of reflection. One aspect of PCK is for teachers to plan for a balanced range of literacy practices. In Phase 2, teachers in the Year 4 Professional Learning Team implied they considered all four practices of the Four Resources Model

(Freebody & Luke, 1990) when planning. However, after reflecting upon results of the Multiliteracies Assessment, teachers indicated that they may not have catered for a balanced range of practices. Two practices they observed as needing more attention were students in role as *Text-User* and *Text Decoder*. The *Text-user* observation is surprising considering that students are exposed on a daily basis to multimodal texts through interactions with the IWB and an assumption might be made that exposure to texts equated with using them. However, my observation was that teachers when using such texts focused on the content, rather than the purpose and structure of webpages, thus disadvantaging their students by lack of explicit instruction on how to access information.

Teacher confidence and professional development supported teachers' development of *Technological Knowledge* (TK). Teachers in both phases demonstrated their TK as they used their IWBs and a variety of software for teaching purposes. Teacher confidence, flexibility and the ability to learn were evident in both phases of this study. At the beginning, early adopters had little training – but they grasped the opportunity, optimistically. Teachers like Janelle, had high levels of TK. However, finding 3 was that *Technological Content Knowledge* (TCK) for teaching Multiliteracies was developing over time through a process of reflection. Further, in this school, content appears to have driven decisions about the pedagogical goals and technologies to be used. As units of work were developed, teachers selected a variety of multimodal texts, including web pages, CD Roms, Learning Objects and teacher-created resources that related to a unit's theme. Janelle was a case in point:

Janelle did not appear to implement TCK when using multimodal texts as learning objects in the classroom. She espoused referring to hyperlinks. However, her reading of the “Picture this” Learning Object, missed some multimodal affordances of the learning object. This was an opportunity lost for enhancing students' understandings. Whilst this learning object contained hypertext, there were also visuals to be accessed, which may have supported student understanding. Janelle failed to do this.

Janelle did appear reflective about which specific technologies are best suited for addressing demonstration of literacy outcomes. This indicated her operation of important TCK. It manifested particularly in her planning where Janelle was very conscious that students have opportunities to use a variety of technological software to

represent their literacy knowledge. After completing professional development that promoted only particular software packages, Janelle commented, “Whilst I value all of these, I’d like to think that exemplary practices have moved beyond these programs alone. And that if students are using ICTs in the most effective way, they might be able to choose which program which would best suit their purposes”.

Teachers’ *Technological Pedagogical Knowledge* (TPK) was grounded in their experience of print-based texts. Like other forms of TPACK knowledge it was developing over time. Reflection upon practice allowed teachers to make explicit their beliefs and recognise the disjunction between their espoused and enacted practices. A traditional print-based approach to learning was applied, rather than considering developmentally appropriate pedagogical designs and strategies that recognised the multimodality of texts. This was evident in Janelle’s classroom. For example, Janelle often cut-and-pasted web pages into word documents, this is very print-based. However, when students needed to research independently using web pages, the multiple modes of communication overwhelmed students. This finding is consistent with Coiro (2003). In situations where texts are challenging, teachers need to adapt their pedagogy by being explicit in whole-class teaching situations and being deliberate in scaffolding students’ understanding. Janelle did this when she used texts with which the students were familiar. She was strongly committed to using multimodal texts in the classroom. However, whilst supporting her students in relation to the familiarity feature by making texts in “kidspeak”, she was not yet bringing her espoused commitment into teaching practice with multimodal texts. The concentration on “kidspeak” was good use of students’ prior knowledge, but it limited their ability to fully comprehend the multimodality of texts.

These findings in relation to teacher’s TPACK knowledge have implications for the types of professional development provided for teachers. In order to develop effective teaching and learning with technology such as IWBs which provide access to multimodal texts, schools need to ensure teachers learn not only how to use IWBs, but also how to build content and pedagogical knowledge relating to the teaching of Multiliteracies. As the literature would suggest, teachers need to have content knowledge in relation to the literacies of new technologies – and specifically where there is focus on multiliterate practices (Cope & Kalantzis, 2000), understandings about multimodal texts (Anstey and Bull, 2006) and curriculum literacies (Department of



Education and the Arts, 2006; Queensland School Curriculum Council, 2001). These types of knowledges are indicated in the relevant aspects of a teacher's TPACK knowledge in Figure 6.1.

***Finding 4: Some teachers worked from a deficit view of learning making judgements about their students as learners based on assumptions and beliefs.***

The school in this study was a culturally and linguistically diverse school. Acknowledgement of what students bring to school as prior knowledge to learning situations is another important aspect of PCK relevant to this study. Deficit views of learning were indicated by two teachers, one from each phase of the study. This finding was consistent with Comber & Kamler's (2004) finding that deficit discourses are evident in classrooms and staffrooms. Deficit discourses related to some students' lack of access to ICTs in their recreational lives, and limited literacy and ICT resources. For some students, lack of access to ICTs in their home lives did not impact negatively upon them as they were able to participate in classroom activities. For some students, as suggested by Dwyer (2001) it would appear that access to IWBs on a daily basis was sufficient to help develop some skills.

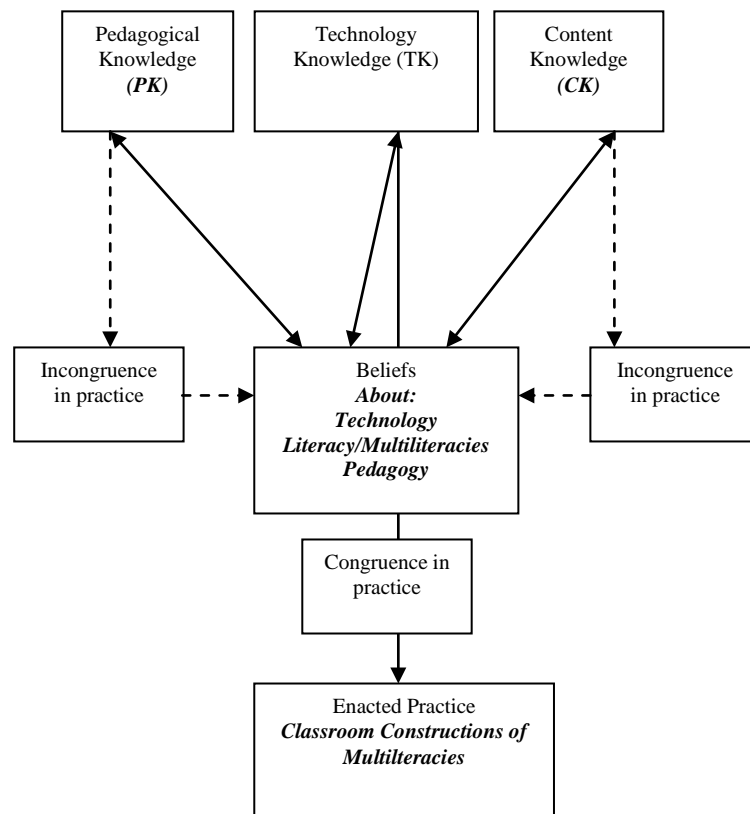
PCK also involves knowing how to cater to students' cultural and linguistic diversity. This feature is central to a Multiliteracies approach. Information about the cultural diversity of the school's community formed part of the Literacy Plan, however, the Plan was undeveloped in Phase 1 and begun but not completed in Phase 2. Teachers were working on beliefs and assumptions based on information provided about some groups of students, for example Aboriginal and Torres Strait Islanders or English as Second Language (ESL) students. They did not have a complete picture of their students as learners. This meant that teachers were operating without what Cazden (2001) referred to as knowledge of the "collective identities" of their students. This impoverished schema of students would have seriously impeded what teachers were in any position to do when considering students' diversity, let alone in catering to it. It must be noted, however, that whilst these collective identities provide teachers with cultural orientations that predict trends in learning, that there is considerable diversity within these collective identities. As such they should not be treated as homogenous groups.

The implications of this fourth finding are that teachers need to have a clear understanding of the knowledge, practices and attitudes that students bring to school and that this needs to be based on correct information about students as learners. Knowledge about students' home literacy practices is important. To achieve this, teachers need to conduct audits of their students' literacy practices, so that their planning and teaching reflect and cater for diversity of practice. Further, they need to view that lack of particular skills or resources is not about deficits skills on behalf of the individual student, but "about access and apprenticeship into institutions and resources, discourse and texts (Luke & Freebody, 1999, p.5). Teachers need to challenge themselves to view the socio-cultural practices and the children's home and community contexts through a wide lens so that they may consider the complexity of issues that impact upon students' lives (Henderson, 2004). Central to this whole study and the findings discussed so far is the need for teachers to align the beliefs they espouse and what they enact in their teaching practice. Intersections amongst teacher knowledge, teacher beliefs and teacher practice are important.

### ***Intersections amongst teacher knowledge, beliefs and practice***

Introduction of any new technology has the potential to change teaching and learning as was apparent with the IWBs project at the hub of this research. This means that teachers need to recognise this and to accept the disequilibrium that will result as they confront their changing beliefs and practices. Any knowledge gained knowledge is adapted into existing frameworks or belief systems rather than passively received is central to a radical constructivist approach taken at the school as outlined in Chapter 3. Argyris and Schon (1974) argued that people frame their actions with an espoused world view which often does not translate into practice. Further, they suggested that if people are unaware of the lack of congruence between their espoused theories (beliefs) and theories-in-use (actions), they cannot manage their practices effectively and in a knowing way (Fletcher, 2005). The importance of examining the issues of congruence and non-congruence of teacher practice was central to this study with the case-study of Janelle providing a close account of one participant's engagement. Unless espoused and enacted theories in use are made visible through a collaborative process of reflection and discussion, teachers may not think, come to know, and teach in a knowing way that aligns what they believe with what they enact.

As numerous researchers (Ertmer, 2005; Higgins & Moseley, 2001; Pajares, 1992) have indicated, the study of teachers' beliefs is a challenging one, in particular when there are inconsistencies between teachers' beliefs (espoused) and teachers' practices (enacted) as indicated in this study. Figure 6.2 illustrates the intersection between teacher knowledge, teacher beliefs and practice and where there were consistencies and inconsistencies. This illustration and suggested hypothesis are based on my observations and understandings from this study.



**Figure 6.2 Intersection amongst Teacher Knowledge, Teacher Practice, Teacher Beliefs**

IWBs had started to impact upon teachers' beliefs about using technology and aspects of Multiliteracies and they identified a need for their literacy teaching practices to change. Whilst their beliefs had started to change, teachers did not have the knowledge of how to teach new literacies presented in multimodal texts. Researchers (Griffin & Ohlsson, 2001; Kagan, 1992; Nespore, 1987; Pajares, 1992) have acknowledged that beliefs are a strong indicator of behaviour. However, in this study a key finding was that teachers needed specific bodies of knowledge to be able to enact

their beliefs. For example, whilst teachers believed that they needed to consider literacy as Multiliteracies, they did not have the necessary content knowledge or pedagogical knowledge to do so. Thus, their beliefs in this area were not enacted. Rather, classroom constructions revealed literacy as print-based in spite of observations of teachers using multimodal texts.

In the literature on beliefs, contextual factors (Fang, 1996) or more significant or different beliefs (Mumby, 1982), have been proposed to explain these inconsistencies. This would also align with Neville's (2005) research into Multiliteracies, in that teachers' prior experiences with how they have taught literacy determine the meaning they make of Multiliteracies. However, Argyris & Shon (1974) suggested that, "Blindness to incongruity between espoused theory and theory-in-use may be culturally as well as individually caused and maintained" (p.viii). Prior to IWBs at the research site, literacy had been culturally constructed and reconstructed as print-based. This lengthy consistency of beliefs would have helped build knowledge about practice which may have predisposed some teachers not only to belief about Multiliteracies, but also to tenacity about the greater significance of the held belief in the face of change. Both of these theories would account for the individual meaning making of some teachers from a radical constructivist approach and collective meanings from a social constructionist approach.

The espoused technological beliefs of teachers were consistent with what they enacted in classrooms. Teachers believed that IWBs and technology were important for teaching and learning purposes. They had developed TK through either adapting their knowledge about using ICTs to use IWBs, or from training on IWBs. Armed with this knowledge, teachers were able to enact beliefs about the technology. Whilst knowledge appears to be central to what teachers did, from a radical constructivist approach and consistent with research on beliefs (e.g.), the current study has shown that teachers with new knowledge will not necessarily assimilate it into their teaching practices. The telling discriminator for my study is whether this knowledge is congruent with their beliefs about technology, pedagogy and Multiliteracies.

### ***Why a Model and Grid?***

The IWB Implementation Grid (Kitson, 2009) (Table 6.1) and the TPACK model (Mishra & Koehler, 2006) offer a helpful way to conceptualise knowledge required by teachers and schools when implementing IWBs that offer exposure to a range of multimodal texts. The grid allows schools and teachers with IWBs to reflect on the processes and conditions needed to enact an effective implementation of IWBs, with the enactment of Multiliteracies. Schools can identify the deliberate actions required to implement this approach through plotting their current stage of progression.

At the teacher level, the TPACK model identifies the important components of knowledge that individual teachers require. Professional development can be targeted to address this knowledge. Reflective tools developed and used within this study are available resources which teachers can use to focus their teaching practice. Miller and Glover (2004) considered teachers need about two years to achieve a more enhanced and interactive process of teaching with IWBs. While this research covered a period of two years, it was evident that Miller and Glover's estimate was too optimistic. Greater time was needed for this to happen in this particular site. Contextual factors or "background design issues" (Hayes, 2007) are realities that can impact on this process and need to be addressed during the integration process. Similarly, examining teacher beliefs is important when promoting teacher change (Ertmer, 2005; Higgins & Moseley, 2001). Applying the toolkit of continuum, reflective tools, and providing professional development targeted at developing teacher knowledge as in the TPACK model may be a better means of effectively and efficiently accounting for the extant contextual factors and congruency issues around teachers' beliefs.

### **Strengths and Limitations of the Study**

The study was designed to address the principles of scientific education research as proposed by the National Research Council (Shavelson & Towne, 2002). It allowed for empirical investigation of the research questions, and has been supported by an explicated conceptual framework in Chapter 3. Further, results have been provided in Chapters 4 and 5 to allow for scrutiny by the educational research community.

This study was shaped by theorised understanding from two perspectives in order to achieve a balanced approach, that of social constructionism and radical

constructivism. A social constructionist approach allowed for a collective notion of what counts as Multiliteracies in relation to classroom events, and radical constructivism provided information about an individual's role in knowledge construction.

These interpretive approaches allowed for multiple voices to be heard in relation to “how” and “why” teachers integrated IWBs for the teaching of multiliterate practices. These multiple realities were then mediated through my own perceptions, with data collected that reflected both participants and my “mutual constructions” (Gubrium & Holstein, 2002, p.678). As the researcher I was the primary research instrument through which all observations were made. While the subjective nature of these interpretations needs to be acknowledged, member checking was performed to counterbalance any researcher bias.

Shavelson & Towne (2002) cited ethnography as a design which makes available a rich description of the contexts in which schools operate, and from which hypotheses may be generated to account for change. Description of the ethno-historical research of this study detailed the introduction of IWBs and has provided an explication of internal and external conditions relating to change. A strength of this study is the detailed description it provides of how one school managed the implementation of a new technology into classrooms.

Findings contribute new understandings about how such an initiative shapes teachers' beliefs and practices. Another strength of the study was the length of time that was spent at the school site. This allowed access to a considerable amount of information in a fluent way. However, a limitation of the study was that despite this lengthy period of observation, it was not possible to view all aspects of teaching and learning in classrooms. Further, as reported elsewhere (Higgins & Moseley, 2001), researching teachers' beliefs is problematic. They are not always directly observable in classrooms or in formal and informal exchanges between people such as researcher and participant.

## **Conclusion**

We live in a changing society marked by the effects of technological advances, globalisation, economies in crisis, and cultural and linguistic diversity. With changes to

the workforce and the call for knowledge workers, it is important to acknowledge the place of technology and multimodal texts as central to the learning process in schools. This calls for a curriculum and pedagogy that is able to situate these changing conditions. Multiliteracies is proposed as one such approach.

In the literature on Multiliteracies, Cope and Kalantzis (2000) emphasised the complexity of a Multiliteracies approach to literacy pedagogy and that their work was to initiate further research. Both Michaels and Sohmer (2000) and Neville (2005) have called for research which considers the complex contexts and conditions in which theories are put into practice, and acknowledge the perspectives, voices and practices of teachers. In IWB literature (Glover et al., 2005, Higgins et al., 2007; Smith et al., 2005) there was relatively little academic empirical research investigating IWBs in education at the commencement of this study. However, this is beginning to change with the publication of research reports (Moss et al., 2007) and peer-reviewed journal articles (Kennewell & Higgins, 2007; Kitson, Fletcher & Kearney, 2007). This study is unique in that it seeks to explore the relationships between teachers' beliefs, knowledge and practices about Multiliteracies and IWB technology over a period of time.

Through this research I have contributed to the literature in these three areas. First, this study has provided data about the challenges of enacting a whole-school implementation of IWBs and how this has shaped teachers' beliefs and practices. Second, the complex process of IWB integration for teachers has been documented, describing their development and growth as they move from technology-driven actions to considerations of pedagogy and content matter. Third, I have reported findings about what counted as multiliterate practices in one Australian school. In doing so, teachers' beliefs were explored for congruence to enacted practice as teachers' pedagogical beliefs mediated how they applied IWB technology in classroom settings.

This study has presented generalisable findings about how the implementation of IWBs revealed change, and how this happened in one school over time. The development of the IWB Implementation Grid (Kitson, 2009) has provided a theorised understanding of the knowledge needed by schools to enact an effective implementation of IWBs that considers Multiliteracies. It integrates and builds upon knowledge from the literature in three often distinct areas: whole school implementation of IWBs, teacher integration and the impact on their beliefs and practice, and Multiliteracies.

Technology such as the IWB allows access to a range of multimodal texts in classrooms. This study provides the day to day particulars of how this school and teachers dealt with the need to rethink literacy, their existing multiliterate practice, and the challenges they faced as they implemented multimodal texts. It contributes to what counts as knowledge and performance in the complex environments mediated by technology.

In seeking to explain consistencies and inconsistencies in teacher beliefs and practices, I established that there is an influential relationship between knowledge, teacher beliefs, and teacher practice. Whilst teachers espoused the need to consider literacy as Multiliteracies, they did not yet have the content knowledge and the pedagogical knowledge to enact this in practice. Knowledge appears central to teachers enacting their beliefs about the use of technology. Whilst this relationship is a proposition based on research in one school, it offers further research opportunities.





## REFERENCES

- Abbott, C. (2002). Writing the visual: The use of graphic symbols in onscreen texts. In I. Snyder (Ed.), *Silicon literacies: Communication, innovation and education in the electronic age*. London: Routledge.
- Agar, M. (2006). An ethnography by any other name ... [149 paragraphs]. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 7(4), Art. 36. Retrieved August 22, 2006 from <http://www.qualitative-research.net/fqs-texte/4-06/06-4-36-e.htm>
- Ainley, J., Banks, D., & Fleming, M. (2002). The influence of IT: Perspectives from five Australian Schools. *Journal of Computer Assisted Learning*, 18, 395-404.
- American Education Research Association (2006). *Standards for reporting on empirical Social Science research in AERA publications*. Washington, DC: Author.
- Alvermann, D. (2004). Multiliteracies and self-questioning in the service of science learning. In *Crossing borders in literacy and science instruction: Perspectives on theory and practice*. Newark, DE: International Reading Association.
- Anderson-Levitt, K.M. (2006). Ethnography. In J.L. Green, G. Camilli & P.B. Elmore (Eds.), *Handbook of complementary methods for research in education* (3rd ed.) Mahwah, NJ: Lawrence Erlbaum.
- Anstey, M. (2002). *Literate Futures: Reading*. Brisbane: Education Queenslandc.
- Anstey, M. & Bull, G., (1996). The practice of children's literature. In Anstey, M. & Bull, G. (Eds.), *The literacy labyrinth* (pp. 198-213). Sydney: Prentice-Hall.
- Anstey, M., & Bull, G. (2004). *The literacy labyrinth* (2nd ed.). Frenchs Forest, NSW: Pearson Education Australia.
- Anstey, M., & Bull, G. (2006). *Teaching and learning Multiliteracies: Changing times, changing literacies*. Kensington Gardens, South Australia: Australian Literacy Educators' Association.
- Applebee, A.N. (1981). *Writing in the secondary school*. Urbana, IL: National Council for the Teaching of English.

- Argyris, C., & Schon, D. (1974). *Theory in practice: Increasing professional effectiveness*. San Francisco: Jossey Bass.
- Atkinson, P., Coffey, A., Delamont, S., Lofland, J., & Lofland, L. (Eds.). (2001). *Handbook of ethnography*. London: Sage
- Auerbach, E. (2001). Considering the Multiliteracies pedagogy through the lens of family literacy. In M. Kalantzis & B. Cope (Eds.), *Transformations in language and learning: Perspectives on Multiliteracies* (pp. 99-111). Melbourne: Common Ground.
- Austin, N. (2003, January 7). Mighty white. *The Guardian*.
- Australian Capital Territory Department of Education and Training (2001). *English Language Curriculum Framework*. Retrieved March 16, 2006 from <http://www.decs.act.gov.au>
- Australian Council of Deans of Education. (2001). *New learning: A charter for Australian education*. Canberra: Author.
- Australian Curriculum, Assessment and Reporting Authority [ACARA] (2008). *National English Curriculum: Framing Paper November 2008*. Canberra: Author.
- Barton, D. (1994). *Literacy: An introduction to the ecology of written language*. Oxford: Blackwell.
- Baynham, M. (1995). *Literacy practices: Investigating literacy in social contexts*. London: Longman.
- Beavis, C. (2005). English at a time of change: Where do we go with text? *English in Australia*, 41(2), 61-68.
- Beeland, W.D. (2002). *Student engagement, visual learning and technology: Can interactive whiteboards help?* Paper presented at the Annual Conference of the Association of Information Technology for Teaching Education, Trinity College, Dublin.
- Bell, M.A. (2001). Updated to survey of use of interactive electronic whiteboard in instruction. Retrieved December 12, 2006 from [http://www.shsu.edu/~lis\\_mah/documents/updateboardindex.htm](http://www.shsu.edu/~lis_mah/documents/updateboardindex.htm)
- Bennett, S., & Lockyer, L. (2008). A study of teachers' integration of interactive whiteboards into four Australian primary school classrooms. *Learning, Media and Technology*, 33(4), 289-300.

- Bigum, C., Durrant, C., Green, B., Honan, E., Lankshear, C., Morgan, W., et al. (1998). *Digital rhetorics: Literacies and technologies in education - Current practices and future directions*. Canberra: DEETYA.
- Bloome, D., Carter, S.P., Christian, B.M., Otto, S., & Shuart-Faris, N. (2005). *Discourse analysis and the study of classroom language and literacy events: A microethnographic perspective*. Mahwah, NJ: Lawrence Erlbaum.
- Board of Studies New South Wales. (2003). *K-6 English Syllabus*. Retrieved March 15, 2006 from [http://k6.boardofstudies.nsw.edu.au/english\\_index.html](http://k6.boardofstudies.nsw.edu.au/english_index.html)
- Bond, D. (2000). Negotiating a pedagogy of Multiliteracies: The communication curriculum in a South African management development programme. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 311-320). Abingdon, UK: Routledge.
- Bourdieu, P. (1991). *Language and symbolic power* (J. Thompson, Ed., G. Raymond & M. Adamson, Trans.). Cambridge, UK: Polity Press.
- Boyle, J. (2002, April 26). Virtual magic. *Times Educational Supplement*.
- Bremner, S., & Dufficy, P. (2006). Meeting diverse reading needs in a multilingual classroom. In R. Ewing (Ed.), *Beyond the reading wars: A balanced approach to helping children learn to read* (pp. 2-5). Newtown, NSW: Primary English Teaching Association.
- Brewer, J.D. (2000). *Ethnography*. Buckingham, UK: Open University Press.
- British Educational Communications Technology Agency [Becta]. (2004). *Getting the most from your interactive whiteboard: A guide for secondary schools*. Coventry, UK: Author.
- Bull, G., & Anstey, M. (2007). Exploring visual literacy through a range of texts. *Practically Primary*, 12(3), 4-7.
- Burden, K. (2002, June). *Learning from the bottom up – The contribution of school based practice and research in the effective use of interactive whiteboards for the FE/HE sector*. Paper presented at the Learning and Skills Research – Making an Impact Regionally Conference, The Earth Centre, Doncaster, United Kingdom.
- Burton, L. (2006). What is this media literacy thing? *Screen Education*, 38, 93-98.
- Butler, S. (2003). *Multiliteracies Pedagogical Reflective Tool*. Unpublished Masters Project. Brisbane: Griffith University.

- Calderhead, J. (1996). Teachers' beliefs and knowledge In D.C. Berliner. & R.C. Calfee (Eds.), *Handbook of educational psychology*. New York: Simon & Schuster MacMillan.
- Callow, J. (2006). Images, politics and Multiliteracies: Using a visual metalanguage. *Australian Journal of Language and Literacy*, 29(1), 7-23.
- Cambourne, B. (2008). What can teachers do about the current debates in reading? *Practically Primary*, 13(2), 4-5.
- Cameron, D. (2000). Situated literacies/Multiliteracies/global literacies and the World Wide Web (Book Review). *Changing English: Studies in Reading and Culture*, 7(2), 203-207.
- Canterbury Christ Church University College (Faculty Learning Technology Team). (2003). *Briefing paper on the application of interactive whiteboards to learning and teaching*. Canterbury, UK: Canterbury Christ Church University College, Learning and Teaching Enhancement Unit.
- Castanheira, M.L., Crawford, T., Dixon, C., & Green, J.L. (2001). Interactional ethnography: An approach to studying the social construction of literate practices. *Linguistics and Education*, 11(4), 353-400.
- Castells, M. (2000). *The rise of the network society* (2nd ed.). Malden, MA: Blackwell.
- Castells, M. (2001). *The Internet galaxy: Reflections on the Internet, business and society*. Oxford: Oxford University.
- Caterinicchia, D. (2000). NSA invests in e-learning. *Federal Computer Week*, 14(16), 18.
- Cazden, C.B. (2000). Taking cultural differences into account. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 249-266). Abingdon, UK: Routledge.
- Christie, F. (2002). *Classroom discourse analysis: A functional perspective*. London: Continuum.
- Clancy, S., & Lowrie, T. (2002). *Researching multimodal texts: Applying a dynamic model*. Paper presented at the Annual Meeting of the Australian Association for Research in Education, Brisbane.
- Clifford, J. (1990). Notes on (field) notes. In R. Sanjek (Ed.), *Fieldnotes: The makings of anthropology* (pp. 47-71). Ithaca, NY: Cornell University Press.

- Coiro, J. (2003). Exploring literacy on the Internet. *The Reading Teacher*, 56(5), 458-454.
- Coles, G. (2003). *Reading the naked truth: Literacy, legislation and lies*. Portsmouth, NH: Heinemann.
- Comber, B., & Kamler, B. (2004). Getting out of deficit: Pedagogies of reconnection. *Teaching Education*, 15(3), 293-310.
- Cooper, S., & Clark, S. (2003). *Showing, Telling, Sharing*: Florida School for the Deaf and Blind. Retrieved March 23, 2006, from <http://edcompass.smarttech.com/en/casestudies/fsdb.aspx>.
- Cope, B., & Kalantzis, M. (1998). Multicultural education: Transforming the mainstream. In S. May (Ed.), *Critical multiculturalism*. London: Falmer Press.
- Cope, B., & Kalantzis, M. (Eds) (2000). *Multiliteracies: Literacy learning and the design of social futures*. Abingdon, UK: Routledge.
- Cope, B., & Kalantzis, M. (Eds). (2001). *Transformations in language and learning: Perspectives on Multiliteracies*. Melbourne: Common Ground.
- Cope, B., & Kalantzis, M. (2002). Manageable knowledge: Communication, learning and organisational change. In B. Cope & R. Freeman (Eds.), *Developing knowledge workers in the printing and publishing industries: Education, training and knowledge management in the publishing supply chain, from creator to consumer*. Melbourne: Common Ground.
- Crosby, P. (1980). *Quality is free: The art of making quality certain*. New York: Mentor.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. St Leonards, NSW: Allen & Unwin.
- Curriculum Corporation (2005). *Statement of learning for English*. Melbourne, Victoria: Author. Retrieved April 14, 2006 from <http://www.curriculum.edu.au>
- Cuttance, P. (2001). Information and communication technologies. In *School Innovation: Pathway to the Knowledge society*. Canberra: Department of Education, Science and Training.
- Damcott, D., Landato, J., Marsh, C., & Rainey, W. (2000). *Report of the use of the smart board interactive whiteboard in physical science*. Retrieved May 21, 2005 from <http://www.smarterkids.org/research/paper3.asp>

- Danaher, P.A., & Harreveld, R.D. (2004). Multiliteracies and distance education: Diversities and technologies in contemporary universities. *Malaysian Journal of Distance Education*, 6(1), 1-4.
- Davies, L., & Greene, T. (1984). *Reading for learning in the sciences*. Edinburgh: Oliver & Boyd.
- Denscombe, M. (1998). *The good research guide for small-scale research projects*. Buckingham, UK: Open University Press.
- Denzin, N.K., & Lincoln, Y.S. (1994). *Handbook of qualitative research*. Thousand Oaks, CA.: Sage.
- Denzin, N.K., & Lincoln, Y.S. (1998). *Handbook of qualitative research*. London: Sage.
- Denzin, N.K., & Lincoln, Y.S. (Eds.) (2000). *Handbook of qualitative research* (2nd ed.). London: Sage.
- Denzin, N.K., & Lincoln, Y.S. (Eds.) (2005). *The SAGE Handbook of qualitative research* (3rd ed.). London: Sage.
- Department of Education, Queensland. (1994). *English Syllabus for Years 1 to 10*. Brisbane: Author.
- Department of Education and the Arts. (2006). *Literacy: Key to learning. Framework for action 2006-2008*. Brisbane: Author.
- Department of Education, Employment and Workplace Relations (DEEWR). (2007). *Literacy and numeracy in the Middle Years of Schooling Queensland Project Report: Meeting in the middle – assessment, pedagogy, learning and educational advantage*. Canberra: Author.
- Department of Education Science and Training (DEST). (2004). *Taking schools to the next level: the national education framework for schools*. Canberra: Author.
- Department of Education Science and Training (DEST). (2005). National Inquiry into the Teaching of Literacy. Author: ACT
- Department of Education, Science and Training [DEST] (2007). *Welcome to the Digital Revolution*. <http://www.digitaleducationrevolution.gov.au/about.htm>. 26/06/08
- Department of Education and Training Tasmania (2007). *English-literacy K-10 syllabus and support materials*. Available at: <http://resources.education.gov.au>
- Department of Education and Training Western Australia (2005). *Outcomes and standards framework: English*. Available at <http://www.eddept.wa.edu.au/curriculum>

- Department of Employment, Education and Training Northern Territory (2005).  
*Northern Territory Curriculum Framework: English learning areas*. Available  
 at [http://www.deet.nt.gov.au/education/teaching\\_and\\_learning/curriculum/](http://www.deet.nt.gov.au/education/teaching_and_learning/curriculum/)
- DePlachett, N. (2008). Placing the magic in the classroom: TPCK in arts education. In  
 AACTE Committee on Innovation and Technology (Eds.), *Handbook of  
 Technological Pedagogical Content Knowledge (TPCK) for educators* (pp.  
 167-192). New York: Routledge.
- Dias, L.B., & Atkinson, S. (2001). Technology integration: Best practices -where do  
 teachers stand? *International Electronic Journal for Leadership in Learning*,  
 5(10), 1-13.
- Dwyer, D.C., Ringstaff, C., & Sandholtz, J.H. (1990). *Teacher beliefs and practices:  
 Part 1. Patterns of change*. Cupertino, CA: Apple Computers.
- Dwyer, J. (2001). Computers in schools: Are they helping our children to learn?  
*Sydney's Child*, November, 2001.
- Education Queensland (1994). English Syllabus Documents. Brisbane: Author.
- Education Queensland (2000a). *Queensland State Education – 2010*. Brisbane: Author.
- Education Queensland (2000b). *Literate Futures: Report of the Literacy Review for  
 Queensland State Schools*. Brisbane: Author.
- Education Queensland (2000c). *New Basics Project technical paper*. Unpublished  
 paper, Education Queensland, Brisbane. Retrieved April 27, 2007 from  
<http://education.qld.gov.au/corporate/newbasics/docs/nbftech.doc>
- Education Queensland (2001). *The Queensland School Longitudinal Reform Study*.  
 Brisbane: GoPrint.
- Education Queensland (2002a). *Productive pedagogies*. Brisbane: Author
- Education Queensland (2002b). *Queensland the Smart State – Education and Training  
 Reforms for the Future*. Brisbane: Author.
- Education Queensland (2006a). *ICT pedagogical licence*. Brisbane: Author.
- Education Queensland (2006b). *Literacy: The Key to Learning*. Brisbane: Author.
- Ellyard, P. (1998). *Ideas for the new millennium*. Melbourne: Melbourne University.
- Emmerson, R.M., Fretz, R.I., & Shaw, L.L. (1995). *Writing ethnographic fieldnotes*.  
 Chicago: University of Chicago.
- Ertmer, P.A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for  
 technology integration. *Educational Technology, Research and Development*.  
 53(4), 25-39.



- Ertmer, P. A., Gopalakrishnan, S., & Ross, E.M. (2001). Technology-using teachers: Comparing perceptions of exemplary technology to use best practice. *Journal of Research on Technology in Education*, 33(5).
- Every, A., & Young, M. (2002). *Multiliteracies and life transitions: Language, literacy and numeracy issues in Aboriginal Health Worker training – An investigation*. Melbourne: Language Australia for Adult Literacy and Numeracy.
- Ewing, R. (2006). *Beyond the Reading Wars: a balanced approach to helping children to learn to read*. Rozelle, NSW: Primary English Teachers Association.
- Fairclough, N. (1995). *Critical discourse analysis*. London: Longmans.
- Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research*, 38(1), 47-65
- Fenstermacher, G. (1994). The knower and the known: The nature of knowledge in research and teaching. *Review of Research in Education*, 20, 3-56.
- Fetterman, D. M. (1998). *Ethnography: Step by step* (2nd ed.). Thousand Oaks, CA: Sage.
- Fleming, M. (2007). The impact of diversity on Queensland classrooms on literacy teaching in changing times. *International Journal of Pedagogies and Learning*, 3(3), 77-91.
- Fletcher, M. A. (2005). Action learning/action research: A teacher-centred approach for self-improving schools. *Literacy Learning: Middle Years*, 13(2), 16-24.
- Fletcher, M. A., Zuber-Skerritt, O., Piggott-Irvine, E., & Bartlett, B. (2008). Qualitative research methods for evaluating action research. In E. Piggott-Irvine & B. Bartlett (Eds), *Evaluating Action Research*, Wellington, New Zealand: NZCER.
- Freebody, P. (2003). *Qualitative research in education: Interaction and practice*. London: Sage.
- Freebody, P., & Luke, A. (1990). Literacies Programs: Debates and demands in cultural context. *Prospect*, 5(3), 7-15.
- Gee, J.P. (1990). *Social linguistics and literacies: Ideology in discourses*. London: Falmer Press.
- Gee, J.P. (1996). *Social linguistics and literacies: Ideology in discourse* (2nd ed.). London: Taylor & Francis.
- Gee, J.P. (2004). *Situated language and learning: A critique of traditional schooling*. New York: Routledge.

- Geertz, C. (1973). *The interpretation of cultures*. New York: Basic Books.
- Glaserfeld, E. von (1995). *Radical constructivism: A way of knowing and learning*. New York: Routledge Falmer.
- Glover, D., & Miller, D. (2001). Running with technology: the pedagogic impact of the large scale introduction of interactive whiteboards in one secondary school. *Journal of Information Technology for Teacher Education*, 10(3), 257-276.
- Glover, D., & Miller, D.J. (2003). Players in the management of change: Introducing interactive whiteboards into schools. *Management in Education*, 17(1), 20-23.
- Glover, D., & Miller, D.J. (2004). New technologies and educational leadership. Missioners, tentatives and luddites: Leadership challenges for school and classroom posed by the introduction of interactive whiteboards into schools in the United Kingdom. Staffordshire, United Kingdom: Department of Education, University of Keele.
- Glover, D., Miller, D., Averis, D., & Door, V. (2005). The interactive whiteboard: A literature survey. *Technology, Pedagogy and Education*, 14(2), 155-170.
- Goldman, S.R. (2003). Learning in complex domains: when and why do multiple representations help. *Learning and Instruction*, 13(2), pp.239-244.
- Goodison, T. (2002a). ICT and attainment at primary levels. *British Journal of Educational Technology*, 33(2), 201-211.
- Goodison, T. (2002b). Learning with ICT at primary level. *Journal of Computer Assisted Learning*, 18, 282-29.
- Goodwyn, A. (1998). Adapting to the textual landscape: bringing print and visual texts together in the classroom. In A. Goodwyn (Ed.), *Literacy and media texts in Secondary English – New approaches*. London: Caswell.
- Gordon, T., Holland, J., & Lahelma, E. (2001). Ethnographic research in educational settings. In P. Atkinson, A. Coffey, S. Delamont, J. Lofland & L.H. Lofland (Eds.), *Handbook of ethnography*. London: Sage.
- Grandgenett, N.F. (2008). Perhaps a matter of imagination: TPACK in mathematics education. In AACTE Committee on Innovation and Technology (Eds.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for educators* (pp.145-165). New York: Routledge.
- Granger, C.A., Moreby, M.L., Lotherington, H., Owston, R.D., & Wideman, M.H. (2002). Factors contributing to teachers' successful implementation of IT. *Journal of Computer Assisted Learning*, 18, 480-488.

- Green, D. (2000). The nature of language: The culture of texts. In R. Campbell and D. Green (Eds.), *Literacies and learners: Current perspectives*. Frenchs Forest, NSW: Pearson Education Australia.
- Green, D. (2006). Understanding language and language learning. In R. Campbell and D. Green (Eds.), *Literacies and learners: Current perspectives* (3rd ed.). Frenchs Forest, New South Wales: Pearson Education Australia.
- Green, J. L., Dixon, C.N., & Zaharlick, A. (2003). Ethnography as a logic of inquiry. In J. Flood, Lapp, D., Squire, J.R., & Jensen, J.M. (Eds.), *Handbook of research on teaching the English language arts* (2nd ed., pp. 201-224). Mahwah, NJ: Lawrence Erlbaum.
- Greenwell, L. (2002). *Physical education: An interactive approach*. Retrieved December 10, 2005 from <http://www.mirandanet.ac.uk/pubs/greenwell.htm>
- Greiffenhagen, C. (2000, July). *Interactive whiteboards in mathematics education: Possibilities and dangers*. Paper presented at the working group on “The Use of Technology in Mathematics Education” at the 9th International Congress on Mathematical Education, Tokyo.
- Griffin, T.D., & Ohlsson, S. (2001). *Beliefs vs knowledge: A necessary distinction for predicting, explaining and assessing conceptual change*. Presented at the 23<sup>rd</sup> Annual Conference of the Cognitive Science Society: Edinburgh, Scotland.
- Guba, E.G., & Lincoln, Y.S. (1981). *Effective evaluation*. San Francisco: Jossey-Bass.
- Guba, E.G., & Lincoln, Y.S. (2005). Paradigmatic controversies, contradictions and emerging confluence. In N.K. Denzin & Y.S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 191-215). Thousand Oaks, CA: Sage
- Gubrium, J.F., & Holstein, J.A. (2000). Analyzing interpretive practice. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 487-508). Thousand Oaks, CA: Sage.
- Gubrium, J.F., & Holstein, J.A. (Eds.) (2001). *Institutional selves*. New York: Oxford University Press.
- Gubrium, J.F., & Holstein, J.A.,(Eds.) (2002). *Handbook of interview research: Context and method*. Thousand Oaks, CA: Sage.
- Gubrium, J.F., & Holstein, J.A. (Eds.) (2008). *Handbook of constructionist research*. New York: Guilford.

- Hall, I., & Higgins, S. (2005). Primary school students' perception of interactive whiteboards. *Journal of Computer Assisted Learning*, 21, 102-117.
- Hamlyn, D.W. (1995). Epistemology, history of. In T. Honderich (Ed.), *The Oxford companion to philosophy*. London: Oxford University Press.
- Hammersley, M., & Atkinson, P. (1995). *Ethnography: Principles in practice* (2nd ed.). New York: Tavistock.
- Hammersley, M., & Atkinson, P. (2007). *Ethnography: Principles in practice* (3rd ed.). New York: Routledge.
- Hammond, J. (2001). Literacies in school education in Australia: Disjunctions between policy and research. *Language and Education*, 15(2), 162-177.
- Hammond, J., & Macken-Horarik, M. (2001). Teachers' voices, teachers' practices: Insider perspectives on literacy education. *Australian Journal of Language and Literacy*, 24(2), pp.112-132.
- Hamston, J. (2006). Pathways to Multiliteracies: Student teachers' critical reflections on a multimodal text. *The Australian Journal of Language and Literacy*, 29(1), 38-51.
- Harris, P., Turbill, J., Fitzsimmons, P., & McKenzie, B. (2001). *Reading in the primary years*. Katoomba, NSW: Social Science Press.
- Harris, T.L. & Hodges, R.E. (Eds.) (1995). *The literacy dictionary: The vocabulary of reading and writing*. Newark, DE: International Reading Association.
- Hayes, D. (2007). Making all the flashy stuff work: The role of the Principal in ICT integration. *Cambridge Journal of Education*, 36(4), 565-578.
- Hayes, D., & Harriman, S. (2001, September/October). *Lowering the integration threshold: Enhancing learning through computer-based technologies*. Paper presented at the Australian Curriculum Studies Association Biennial Conference 2001: Education Futures and New Citizenship, Australian National University, Canberra.
- Hayes, D., & Yates, L. (2002). *What does 'enhanced learning through computer-based technologies' actually look like?* Paper presented at the Australian Association for Research in Education Conference, Brisbane.
- Healy, A. (2006). Multiliteracies: Teachers and students at work in new ways with literacy. In R. Campbell & D. Green (Eds.), *Literacies and learners: Current perspectives* (pp. 191-207). Frenchs Forest, NSW: Prentice Hall Australia.

- Healy, A. (2008). *Multiliteracies and diversity in education: New pedagogies for expanding landscapes*. South Melbourne: Oxford University Press.
- Heath, S.B. (1982). Ethnography in education: Defining the essentials. In P. Gilmore & A.A. Glatthorn (Eds.), *Children in and out of school: Ethnography and education*. Washington, DC: Center for Applied Linguistics.
- Heath, S.B., & Street, B.V. (2008). *On ethnography: Approaches to language and literacy research*. New York: Teachers College Press.
- Henderson, R. (2004). Recognising difference: One of the challenges of using a multiliteracies approach. *Practically Primary* 9(2), 11-14.
- Higgin, S., Beauchamp., & Miller, D. (2007). Reviewing the literature on interactive whiteboards. *Learning, Media and Technology*, 32(3), 213-225.
- Higgins, S., Falzon, C., Hall, I., Moseley, D., Smith, F., Smith, H., & Wall, K. (2005). *Embedding ICT in the literacy and numeracy strategies: Final report*. Newcastle-upon-Tyne, UK: Newcastle University.
- Higgins, S., & Moseley, D. (2001). Teachers' thinking about Information and Communications Technology and learning: Beliefs and outcomes. *Teacher Development*, 5(2), 191-210.
- Hill, P., & Crevola, C. (1999). Key features of a whole-school design approach to literacy teaching in schools. *Australian Journal of Disabilities*, 4(3), 5-11.
- Hodgman, C. (2005). Multiliteracies: Another dimension of information literacy. *Scan*, 24(4), 20-25.
- Hollingdale, P. (1995). Children's literature in an age of multiple literacies. *Australian Journal of Language and Literacy*, 18(4), 248-258.
- Holstein, J.A., & Gubrium, J.F. (2008). Constructionist impulses in ethnographic fieldwork. In J.A. Holstein & J.F. Gubrium (Eds.), *Handbook of constructionist research* (pp. 373-395). New York: Guilford.
- Hooper, S., & Reiber, L.P. (1995). Teaching with technology. In A.C. Ornstein (Ed.), *Teaching: Theory into practice* (pp. 154-170). Needham Heights, MA: Allyn and Bacon.
- Hughes, J. (2004). Technology learning principles for preservice and in-service teacher education. *Contemporary Issues in Technology and Teacher Education*, 4(3), 345-362.
- Hughes, J.E., & Scharber, C.M. (2005). Leveraging the development of English TPCK within the deictic nature of literacy. In AACTE Committee on Innovation and

- Technology (Eds.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for educators* (pp. 87-106). New York: Routledge.
- Huijser, H. (2006). Refocusing Multiliteracies for the net generation. *International Journal of Pedagogies and Learning*, 2(1), 22-34.
- Intel Corporation (2005). Intel Teach to the Future Program.  
<http://www.intel.com/education/teach/>
- International Reading Association (2004). Standards for reading professionals – revised 2003. Newark, DE: International Reading Association.
- Jamerson, J. (2002). Helping all children learn: Action research project. Retrieved December 10, 2005 from <http://www.smarterkids.org/research/paper15asp>
- Janks, H. (2004). The access paradox. *English in Australia*, 139, 33-42.
- Jewitt, C. (2005). Multimodality, “reading”, and “writing” for the 21st century. *Discourse: Studies in the Cultural Politics of Education*, 26(3), 315–31
- Jewitt, C. (2006). *Technology, literacy and learning: A multimodal approach*. Abingdon, UK: Routledge.
- Jewitt, C. (2008). Multimodality and literacy in school classrooms. *Review of Research in Education*, 32, 241-267.
- Jewitt, C., & Kress, G. (Eds.) (2003). *Multimodal literacy*. New York: Peter Lang.
- Kagan, D.M. (1992). Implications of research on teacher belief. *Educational Psychologist*, 27(1), 65-90
- Kalantzis, M. (2006). Changing subjectivities, new learning. *Pedagogies: An International Journal*, 1(1), 7-12.
- Kalantzis, M., & Cope, B. (1993). Histories of pedagogy, cultures and schooling. In B. Cope & M. Kalantzis (Eds.). *The powers of literacy: A genre approach to teaching literacy*. London: Falmer Press.
- Kalantzis, M., & Cope, B. (2001). *Transformations in language and learning: Perspectives on Multiliteracies*. Melbourne: Common Ground.
- Kalantzis, M., & Cope, B. (2004). Text-made text. *E-Learning*, 1(2), 198-282.
- Kalantzis, M., Cope, B., & The Learning by Design Project Group (2005). *Learning by Design*. Melbourne: Victorian Schools Innovation Commission.
- Kane, R., Sandetto, S., & Heath, C. (2002). Telling half the story: A critical review of research on the teaching beliefs and practices of university academics. *Review of Educational Research*, 72, 177-228.

- Kearney, J.F., & Kitson, L.A. (2005). Learning from a Nintendo kid. *Literacy Learning: The Middle Years*, 13(3), 15-28.
- Keating, T., & Evans, E. (2001, March). *Three computers in the back of the classroom: Pre-service teachers' conceptions of technology integration*. Paper presented at the 2001 annual meeting of the American Educational Research Association, Seattle, WA.
- Kelly, G.J. (2006). Epistemology and educational research. In J.L. Green, G. Camilli & P.B. Elmore (Eds.), *Handbook of complementary methods for research in education* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Kelly, L.E. (2008). The role of TPACK in physical education. In AACTE Committee on Innovation and Technology (Eds.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for educators* (pp. 207-220). New York: Routledge.
- Kelly, M.A. (2008). Bridging digital and cultural divides: TPACK for equity access to technology. In AACTE Committee on Innovation and Technology (Eds.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for educators* (pp. 31-58). New York: Routledge.
- Kemmis, S. (2007). Action research. In M. Hammersley (Ed.), *Educational research and evidence-based practice* (pp. 167-179). Los Angeles: Sage.
- Kennewell, S. (2001). Using affordances and constraints to evaluate the use of information and communications technology in teaching and learning. *Journal of Information Technology for Teacher Education*, 109(1-2), 101-116.
- Kent, P. (2003). *Smartboards: Interactive whiteboards in classrooms*. Canberra: Australian Capital Territory Education and Training.
- Kent, P. (2008). *Interactive whiteboards: A practical guide for primary teachers*. South Yarra, Victoria: Macmillan Masterclass.
- Kent, P., & Holdway, M. (2009). Interactive whiteboards, productive pedagogies and literacy teaching. *Literacy Learning: The Middle Years*, 17(1), 21-25.
- Kist, W. (2005). *New literacies in action: Teaching and learning in multiple media*. New York: Teachers College Press.
- Kitson, L.A. (2009). IWB Implementation Grid. Brisbane: Griffith University
- Kitson, L., Fletcher, M.F., & Kearney, J.F. (2007). Continuity and change in literacy practices: A move towards Multiliteracies. *Journal of Classroom Interaction*, 41/42(2/1), 29-41.

- Kitson, L., Kearney, J.F., & Fletcher, M. (2005). *Transversing the digital divide using Interactive Whiteboards*. Paper presented at Teacher Education: Local and Global, Centre for Professional Development, Griffith University, Brisbane.
- Knight, P., Pennant, J., & Piggott, J. (2004). What does it mean to 'use the interactive whiteboard' in the daily mathematics lesson? *Micromath*, 20(2), 14-16.
- Knobel, M. (1999). *Everyday literacies: Students, discourse, and social practice*. New York: Peter Lang.
- Koehler, M.J., & Mishra, P. (2008). Introducing TPACK. In AACTE Committee on Innovation and Technology (Eds). *Handbook of Technological Pedagogical Knowledge (TPCK) for Educators* (pp.3-29). New York: Routledge.
- Kress, G. (1997). Visual and verbal modes of representation in electronically mediated communication: The potentials of new forms of text. In I. Snyder (Ed.), *Page to screen: Taking literacy into the electronic era* (pp. 53-79). St. Leonards, NSW: Allen & Unwin.
- Kress, G., & van Leeuwen, T. (2001). *Multimodal discourse: The modes and media of contemporary communication*. London: Arnold, Hodder Headline Group.
- Kuhn, T.S. (1970). *The structure of scientific revolutions*. Chicago: University of Chicago Press.
- Lagemann, E.C. (2000). *An elusive science: The troubling history of education research*. Chicago: University of Chicago Press.
- Lankshear, C., Gee, J., Knobel, M., & Searle, C. (1997). *Changing literacies*, Philadelphia: Open University Press.
- Lankshear, C., & Knobel, M. (2000). Mapping postmodern literacies. *Journal of Literacy and Technology*, 1(1), 1-21.
- Lankshear, C., Snyder, I. with Green, B. (2000). *Teachers and technoliteracy: Managing literacy, technology and learning in schools*. St Leonards, NSW: Allen & Unwin.
- LeCompte, M.D., & Preissle, J. (1993). *Ethnography and qualitative design in educational research* (2nd ed.). San Diego, CA: Academic Press.
- LeCompte, M.D. & Schensule, J.J. (1999). *Designing and conducting ethnographic research*. Walnut Creek, California: AltaMira Press.
- Lee, J.K. (2008). Towards democracy: Social studies and TPACK. In AACTE Committee on Innovation and Technology (Eds.), *Handbook of Technological*



- Pedagogical Content Knowledge (TPCK) for educators* (pp. 129-144). New York: Routledge.
- Lee, M. (2004). Interactive whiteboards: Towards a vision of a digital hub. *The Practicing Administrator*, 26(3).
- Lee, M., & Boyle, M. (2003). *The educational effects and implications of the Interactive Whiteboard Strategy of Richardson Primary School*. Richardson Primary School, ACT, Australia. Retrieved May 1, 2005 from [http://richardsonps.act.edu.au/RichardsonReview\\_Grey.pdf](http://richardsonps.act.edu.au/RichardsonReview_Grey.pdf)
- Lee, M., & Gaffney, M. (2008). *Leading a digital school: Principles and practice*. Melbourne: ACER Press.
- Leu, D.J. (1997). Caity's question: Literacy as deixis on the Internet. *The Reading Teacher*, 53, 424-428.
- Leu, D.J., & Kinzer, C. (2000). The convergence of literacy instruction with networked technologies for information and communication. *Reading Research Quarterly*, 35(1), 108-127.
- Levy, P. (2002). *Interactive whiteboards in learning and teaching in two Sheffield schools: A developmental study*. Sheffield, UK: University of Sheffield, Department of Information Studies.
- Liau, A., Teoh, G., & Liah, M. (2003). The case for emotional literacy: The influence of emotional intelligence on problem behaviours in Malaysian Secondary Schools. *Journal of Moral Education*, 32(1), 51-66.
- Lima, E.S. (1995). Culture revisited: Vygotsky's ideas in Brazil. *Anthropology and Education Quarterly*, 26(4), 443-457.
- Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Lo Bianco, J. (2000). Multiliteracies and multilinguism. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp.92-105). Abingdon, UK: Routledge.
- Lodge, H. (1997). *Providing access to academic literacy in the Arts Foundation Programme at the University of the Witwatersrand in 1996: The theory behind the practice*. Unpublished master's thesis, University of the Witwatersrand, South Africa.
- Lohrey, A. (1995). *Transferability in relation to the key competencies*. Sydney: Centre for Workplace Communication and Culture.

- Lotherington, H. (2008). [Digital epistemologies and classroom Multiliteracies](#). In T. Hansson (Ed.), *Handbook of research on digital information technologies: Innovations, methods and ethical issues*. Hershey, PA: Information Science Reference.
- Lowrie, T., & Clancy, S. (2003). *Multimodal texts: Numeracy development in naturalistic learning contexts*. Paper presented at the Annual Meeting of the Australian Association for Research in Education, Auckland, New Zealand.
- Ludwig, C. (2003). Making sense of literacy. *Newsletter of the Australian Literacy Educators' Association, February*, 1-4.
- Luke, A. (1992). *When basic skills and information processing just aren't enough: Rethinking reading in new times*. A.J.A. Nelson Address presented at Australian Council for Adult Literacy National Conference, Sydney.
- Luke, A. (1993). The social construction of literacy in the primary school. In L. Unsworth (Ed.), *Literacy learning and teaching: Language as social practice in the primary school*. Melbourne: Macmillan.
- Luke, A. (1994). *The social construction of literacy in the primary school*. Melbourne: MacMillan.
- Luke, A. (2006). Editorial introduction: Why pedagogies? *Pedagogies: An International Journal*, 1(1), 1-6.
- Luke, A., & Carrington, V. (2002). Globalisation, literacy, curriculum practice. In R. Fisher, M. Lewis, & G. Books (Eds.), *Raising standards in literacy*. London: Routledge Farmer.
- Luke, A., Comber, B., & Grant, H. (2003). Critical literacies and cultural studies. In G. Bull & M. Anstey (Eds.), *The literacy lexicon* (2nd ed., pp. 15-35). Frenchs Forest, NSW, Pearson Education Australia.
- Luke, A. & Freebody, P. (1999). A map of possible practices: Further notes on the four resources model. *Practically Primary*, 4(2), 5-8.
- Luke, A., & Luke, C. (2001). Adolescent lost/childhood regained. *English in Australia*, 131, 35-48.
- Luke, C. (2000). Cyberschooling and technological change: Multiliteracies for new times. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 69-91). Abingdon, UK: Routledge.

- Lundeberg, M., Bergland, M., Kylczek, K., & Hoffman, D. (2003). Using action research to develop preservice teachers' confidence, knowledge and beliefs about technology. *The Journal of Interactive Online Learning*, 1(4), 1-16.
- Mackey, M. (1998). *The case of Peter Rabbit: Changing conditions of literature for children*. New York: Garland.
- Mackey, M. (2003). Television and the teenage literate: Discourses of 'Felicity'. *College English*, 65(4), 389-410.
- Malavet, P.A. (1998). *Interactive whiteboards: The technology of the future, working with traditional pedagogical methodology*. Retrieved June 20, 2003 from [http://nersp.nerdc.ufl.edu/\\_malavet](http://nersp.nerdc.ufl.edu/_malavet)
- Marland, P. W. (1995). Implicit theories of teaching. In L. W. Anderson (Ed.), *International encyclopedia of teaching and teacher education* (2nd ed., pp. 131-136). Oxford, England: Pergamon Press.
- Martin, J.R. (1993). Life as a noun: Arresting the universe in science and the humanities. In M.A.K. Halliday & J.R. Martin (Eds.), *Writing science: Literacy and discursive power*. London: Falmer Press.
- Mason, C. (2004). Plugging in: Engaging students in the English classroom through a Multiliteracies approach to teaching the matrix as film as text. *English in Australia*, 141, 58-61.
- Mason, J. (1996). *Qualitative researching*. London: Sage.
- Maynard, M. (1994). Methods, practice and epistemology: The debate about feminism and research. In M. Maynard & J. Purvis (Eds.), *Researching women's lives from a feminist perspective* (pp. 10-26). London: Taylor & Francis.
- McCormick, R., & Scrimshaw, P. (2001) Information and communications technology, knowledge and pedagogy. *Education, Communication and Information*, 1, 37-57.
- McGill-Franzen, A., & Lanford, C. (1994). Exposing the edge of the preschool curriculum: Teachers' talk about text and children's literacy understanding. *Language Arts*, 71, 264-273.
- Mehan, H. (1979). *Learning lessons: Social organization in the classroom*. Cambridge, MA: Harvard University Press.
- Merriam, S. B. (1988). *Case-study research in education: A qualitative approach*. San Francisco: Jossey-Bass.

- Meredyth, D., Russell, N., Blackwood, L., Thomas, J., & Wise, P. (1999). *Real time: Computers, change and schooling*. Canberra: Australian Key Centre for Cultural and Media Policy & Macmillan Printing Group.
- Michaels, S. & Sohmer, R. (2001). 'Literacies' and 'Discourses' that promote new academic literacies. In M. Kalantzis & B.Cope (Eds.). *Transformations in Language and Learning: Perspectives on Multiliteracies*. Australia: Common Ground.
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Miller, D., & Glover, D. (2002). The interactive whiteboard as a force for pedagogic change: the experience of five elementary schools in an English authority. *Information Technology in Childhood Education Annual, 2002*(1), 5-19.
- Miller, D., Glover, D., & Averis, D. (2004). *Panacea or prop: The role of the interactive whiteboard in improving teaching effectiveness*. Paper presented at the Tenth International Congress of Mathematics Education, Copenhagen. Retrieved May 16, 2007 from [http://www.icme-organisers.dk/tsg15/Glover\\_et\\_al.pdf](http://www.icme-organisers.dk/tsg15/Glover_et_al.pdf)
- Mills, K.A. (2005a). Deconstructing binary oppositions in literacy discourse and pedagogy. *Australian Journal of Language and Literacy, 28*(1), 67–82.
- Mills, K.A. (2005b). *Multiliteracies: Remnant discourses and pedagogies*. Paper presented at the Australian Literacy Educators' Association & Australian Association of the Teaching of English National Conference, Broadbeach, Queensland.
- Mills, K.A. (2006a). *Critical framing in Multiliteracies*. Paper presented at the Australian Literacy Educators' Association & Australian Association of the Teaching of English National Conference, Darwin, Northern Territory.
- Mills, K.A. (2006b). Mr. Travelling-at-will Ted Doyle: Discourses in a Multiliteracies classroom. *Australian Journal of Language and Literacy, 28*(2), 132–49.
- Mills, K.A. (2006c). *Multiliteracies: A critical ethnography: Pedagogy, power and discourse, and access to Multiliteracies*. Brisbane: Queensland University of Technology. Retrieved January 26, 2009 from <http://www.eprints.qut.edu.au/16244/>

- Mills, K.A. (2006d). We've been wastin' a whole million watchin' her doin' her shoes: Situated practice within a pedagogy of Multiliteracies. *The Australian Educational Researcher*, 33(3), 13–34.
- Mills, K.A. (2007a). *Access to Multiliteracies: A critical ethnography*. Unpublished PhD thesis, Griffith University, Brisbane. PhD or master's
- Mills, K.A. (2007b). Have you seen Lord of the Rings? Power, pedagogy and discourses in a Multiliteracies classroom. *Journal of Language and Identity in Education*, 6(3), 221–41.
- Mills, K.A. (2009). Multiliteracies: Interrogating competing discourses. *Language and Education*, 23(2), 103-116.
- Ministerial Council for Education, Employment, Training and Youth Affairs [MCEETYA]. (1997). *National Literacy Goal*. Retrieved October 22, 2001 from [http://www.mceecdya.edu.au/mceecdya/6th\\_mceetya\\_meeting,11510.html](http://www.mceecdya.edu.au/mceecdya/6th_mceetya_meeting,11510.html)
- Ministerial Council for Education, Employment, Training and Youth Affairs [MCEETYA]. (1999). *The Adelaide declaration on national goals for schooling in the twenty first century*. Retrieved January 15, 2006 from <http://www.mceetya.edu.au/mceetya/nationalgoals/natgoals.htm>
- Ministerial Council for Education, Employment, Training and Youth Affairs [MCEETYA] (2003). *Statements of learning for English*. Retrieved March 23, 2007 from [http://www.mceecdya.edu.au/mceecdya/statements\\_of\\_learning,22835.html](http://www.mceecdya.edu.au/mceecdya/statements_of_learning,22835.html)
- Mishra, P. (2008). *TPACK (was TPCK)*. Retrieved January 1, 2009 from <http://punya.educ.msu.edu/research/tpck>
- Mishra, P., & Koehler, M.J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teacher College Record*, 108(6), 1017-1054.
- Moats, L.C. (1999). *Teaching reading is rocket science: What expert teachers of reading should know and be able to do*. Washington, DC: American Federation of Teachers.
- Moseley, D., Higgins, S., Bramald, R., Hardman, F., et al. (1999). *Ways forward with ICT: Effective pedagogy using information and communications technology for literacy and numeracy in primary schools*. Newcastle Upon Tyne, UK: Newcastle University.

- Moss, G., Jewitt, C., Levaic, R., Armstrong, V., Cardini, A., & Castle, F. (2007). *The Interactive Whiteboards, Pedagogy and Pupil Performance Evaluation: An Evaluation of the Schools Whiteboard Expansion (SWE) Project: London Challenge*. London: Institute of Education, Department for Education and Skills.
- Mumby, H. (1982). The place of teachers' beliefs on research on teacher thinking and decision making, and an alternative methodology. *Instructional Science*, 11, 201-225.
- National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Jessup, MD: National Institute for Literacy.
- Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies*, 19(4), 317-328.
- Neuman, W.L. (2000). *Social research methods: Qualitative and quantitative approaches* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Neuman, W.L. (2006). *Social research methods: Qualitative and quantitative approaches* (6th ed.). Boston: Pearson Education Inc.
- Neville, M. (2005). Innovation in Queensland education: Multiliteracies in action. In *Learning by Design* (pp. 231-256). Melbourne: Common Ground.
- New South Wales Department of Education and Training [NSWDET] (2008). *Click: A technology guide for parents*. Retrieved August 14, 2008 from <http://www.schools.nsw.edu.au/media/downloads/schoolsweb/news/technology/click.pdf>.
- Newfield, D., & Stein, P. (2000). The Multiliteracies Project: South African teachers respond. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp.69-91). Abingdon, UK: Routledge.
- New London Group. (1996). A pedagogy of Multiliteracies: Designing social futures. *Harvard Educational Review*, 66(1), 60-92.
- Newman, M. (2005). Rap as literacy: A genre of Hip-hop ciphers. *Text*, 25(3), 399-436.
- Newmann, F.M., & Wehlage, G.G. (1993). Crafting authentic instruction. *Issues in restructuring schools* (Spring Report 4). [*Educational Leadership*, 50(7), 8-12]
- Niess, M.L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teacher and Teacher Education*, 21(5), 509-523.

- Nixon, H., & Comber, B. (2001). Film and video bridge: Popular and classroom cultures. *Journal of Adolescent and Adult Literacy*, 44(5), 480-487.
- Noad, B. (2005). *Learning to be teachers of visual literacy and teachers of Multiliteracies*. Paper presented at the 33rd Annual ATEA Conference, Surfers Paradise, Queensland.
- O'Brien, D.G. (2001). "At-Risk" adolescents: Redefining competence through the Multiliteracies of intermediality, visual arts, and representation. *Reading Online*, 4(11). Retrieved February 1, 2008 from [http://www.readingonline.org/newliteracies/lit\\_index.asp?HREF=/newliteracies/obrien/index.html](http://www.readingonline.org/newliteracies/lit_index.asp?HREF=/newliteracies/obrien/index.html).
- O'Rourke, M. (2001). Engaging students through ICT: A Multiliteracies approach. *Teacher Learning Network Journal: Change, Growth and Innovation*, 8(3), 12-13.
- Organisation for Economic Cooperation and Development (OECD). (1997). *Information technology outlook 1997*. (Report). Paris: Author.
- Pajares, M.F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.
- Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.
- Pennycook, A. (1996). TESOL and critical literacies: Modern, post or neo? *TESOL Quarterly*, 30(1), 163-171.
- Piaget, J. (1970). *Genetic epistemology*. New York: Columbia University Press.
- Pole, C., & Morrison, M. (2003). *Ethnography for education*. Buckingham, UK: Open University Press.
- Prain, V. (1997). Multi(national)literacies and globalising discourses. *Discourse: Studies in the Cultural Politics of Education*, 18(3), 453-467.
- Prensky, M. (2001). Digital natives, digital immigrants. *On The Horizon*, 9(5), 2-6.
- Queensland School Curriculum Council (2001). *Literacy Position Paper*. Brisbane: Author.
- Rassool, N. (1999). *Literacy for sustainable development in the age of information*. Clevedon, Victoria: Multilingual Matters.

- Rex, L., Green, J., & Dixon, C. (1997). Making a case from evidence: Constructing opportunities for learning academic literacy practices. *Interpretations: Journal of the English Teachers Association of Western Australia*, 30 (2), 78-104.
- Richards, G. (1978). *Classroom language: What sort?* London: Allen & Unwin.
- Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J. Sikula (Ed.), *Handbook of research on teacher education* (pp. 102-119). New York: Simon & Schuster
- Rogers, E. (1983). *Diffusion of innovations* (3rd ed.). New York: Free Press.
- Roth, W. M. (2006). But does “ethnography by any other name” really promote real ethnography? [33 paragraphs]. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 7(4), Art. 37. Retrieved August 22, 2006 from <http://nbn-resolving.de/urn:nbn:de:0114-fqs0604374>
- Rowell, H., Kosnick, C., & Beck, C. (2008). Fostering Multiliteracies pedagogy through preservice teacher education. *Teaching Education*, 19(2), 109-122.
- Ryan, M., & Healy, A. (2008). ‘Art’efacts of knowing: Multiliteracies and the arts. In A. Healy (Ed.) *Multiliteracies and diversity in education: New pedagogies for expanding landscapes* (pp. 82-101). Melbourne: Oxford University Press.
- Ryan, M., & Rossi, T. (2008). The transdisciplinary potential of Multiliteracies: Bodily performance and meaning-making in health and physical education. In A. Healy (Ed.), *Multiliteracies and diversity in education: New pedagogies for expanding landscapes* (pp. 30-57). Melbourne: Oxford University Press.
- Sandholtz, J.H., Ringstaff, C., & Dwyer, D.C. (1997). *Teaching with technology: Creating student-centered classrooms*. New York: Teachers College Press.
- Schensule, J.J., LeCompte, M.D., Nastasi, B.K., & Borgatti, S.P. (1999). *Enhanced ethnographic methods: Audio visual techniques, focused group interviews and elicitation techniques*. Walnut Creek, CA: Altamira Press.
- Schuck, S., & Kearney, M. (2007). *Exploring pedagogy with Interactive Whiteboards: A case study of six schools*. Sydney: University of Technology Sydney. Retrieved May 16, 2007 from <http://www.ed-dev.uts.edu.au/teachered/research/iwbproject/pdfs/iwbreportweb.pdf>
- Schmidt, D.A., & Gurbo, M. (2008). TPCK in K-6 literacy education: It’s not that elementary! In AACTE Committee on Innovation and Technology (Eds.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for educators* (pp. 61-85). New York: Routledge.



- Schwandt, T.A. (1994). Constructivist, interpretivist approaches to human inquiry. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage
- Scrimshaw, P. (2004). *Enabling teachers to make successful use of ICT*. Coventry, UK: British Educational Communications Technology Agency.
- Sherry, L., Billig, S., Tavalin, F., & Gibson, D. (2000). New insights in technology adoption in schools. *T.H.E. Journal*, 27(7), 43-46
- Shulman, L.S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2) 4-14.
- Silverman, D. (2006). *Interpreting qualitative data* (3rd ed.). London: Sage.
- Smart Technologies. (2004). The history of SMART technologies Inc. Retrieved March 22, 2005 from <http://www.smarttech.com/company/aboutus/history.asp>
- Smart Technologies. (2005). *Interactive Whiteboards and learning: A review of classroom case studies and research literature, April 2004*. Canada: Smart Technologies Inc.
- Smith, F., Hardman, F., & Higgins, S. (2006). The impact of interactive whiteboards on teacher pupil interaction in the national literacy and numeracy strategies. *British Educational Research Journal*, 32(3), 443–457.
- Smith, H. (2001). Smartboard evaluation: Final report. Retrieved November 27, 2005 from <http://www.kented.org.uk/ngfl/ict/IWB/whiteboards/index.html>
- Smith, H.J., Higgins, S., Wall, K., & Miller, J. (2005). Interactive whiteboards: Boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning*, 21, 91-101.
- Smith, K., & Woodward, A. (2007). Action research: A vehicle for inspiring multi-literacies. *Literacy Learning: The Middle Years*, 15(3), 20-28.
- Snow, C.E., Griffin, P., & Burns, M.S. (eds) (2005). Knowledge to support the teaching of reading: Preparing teachers for a changing world. San Francisco, CA: Jossey-Bass.
- Snyder, I. (Ed.) (1997a). *Page to screen: Taking literacy into the electronic era*. St. Leonards, NSW: Allen & Unwin.
- Snyder, I. (1997b). Beyond the hype: Reassessing hypertext. In I. Snyder (Ed.), *Page to screen: Taking literacy into the electronic era*. St. Leonards, NSW: Allen & Unwin.

- Snyder, I. (2008). *The literacy wars: Why teaching children to read and write is a battleground in Australia*. St Leonards, NSW: Allen & Unwin.
- Somekh, B., Haldane, M., Jones, K., Lewin, C., Steadman, S., et al. (2005). *Interim report to the Department for Education and Skills*. Unpublished report from the SWEEP project. Coventry, UK: British Educational Communications Technology Agency.
- Somekh, B., Haldane, M., Jones, K., Lewin, C., Steadman, S., et al. (2007). *Evaluation of the primary schools whiteboard expansion project: Report to the Department of Children, Schools and Family*. Coventry, UK: British Educational Communications Technology Agency. Accessed at: South Australian Department of Education and Children's Services (2004). *South Australian Curriculum Standards and Accountability Framework*. Available at: <http://www.sasca.sa.edu.au/splash.asp>.
- South Australian Department of Education and Children's Services (2004). *South Australian Curriculum Standards and Accountability Framework*. Available at: <http://www.sasca.sa.edu.au/splash.asp>.
- Spradley, J.P. (1980). *Participant observation*. New York: Holt, Rinehart and Winston.
- Spradley, J.P., & McCurdy, D.W. (1972). *The cultural experience: Ethnography in complex society*. Chicago: Science Research Associates.
- Stake, R.E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- State of Victoria Department of Education and Early Childhood Development (2007). *Evidence-based research for expert literacy teaching*. Victoria: Author.
- Stevens, L.P. (2001) South Park and society: Instructional and curricular implications of popular culture in the classroom. *Journal of Adolescent and Adult Literacy*, 44(6), 548-555.
- Stewart, T.A. (1998). *Intellectual capital: The new wealth of organisations*. New York: Bantam Books.
- Street, B.V. (1984). *Literacy in theory and practice*. Cambridge, UK: Cambridge University Press.
- Street, B.V. (1997). The implications of the New Literacy Studies for literacy education. *English in Education*, 31(3), pp.45-59.
- Street, B.V. (2000). Literacy events and literacy practices. In M. Martin-Jones & K. Jones (Eds.), *Multilingual literacies: Comparative perspectives on research and practice* (pp. 17-29). Amsterdam: John Benjamins.

- Street, B.V. (2001). (Ed.) *Literacy and development: Ethnographic perspectives*. London: Routledge.
- Street, B.V. (2003). The limits of the local-autonomous or disembedding. *International Journal of Learning*, 10, 2825-2830.
- Sutherland-Smith, W. (2002). Weaving the literacy web: Changes in reading from page to screen. *The Reading Teacher*, 55, 662-669.
- Swenson, J., Rozema, R., Young, C.A., McGrail, E., & Whitin, P. (2005). Beliefs about technology and the preparation of English teachers: Beginning the conversation. *Contemporary Issues in Technology and Education*, 5(3/4), 210-236.
- Tameside Metropolitan Borough Council. (2003). *Interim report in practice using interactive whiteboards in Tameside primary schools*. Retrieved June 30, 2005 from [http://www.tameside.gov.uk/schools\\_grid/ict/whiteboards.pdf](http://www.tameside.gov.uk/schools_grid/ict/whiteboards.pdf)
- Tharpe, R.G., & Gallimore R. (1988). *Rousing minds to life: Teaching, learning and schooling in social context*. Cambridge, UK: Cambridge University Press.
- Thomas, A. (2003, May 23) Little touches that spell success. *Times Educational Supplement*.
- Thompson, A. G. (1992). Teachers' beliefs and conceptions: A synthesis of the research. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 127-146). New York: Macmillan.
- Thwaites, T. (1999). *Multiliteracies: A new direction for arts education*. Paper presented at the Joint Meeting of the Australian Association for Research in Education & New Zealand Association for Research in Education, Melbourne.
- Trimbur, J. (2001) Review of Multiliteracies: Literacy learning and the design of social futures. *College Composition and Communication*, 52(4), 659-662.
- Trumball, D.J. (1987). On changing perspective: An examination of teachers' dilemmas. *Journal of Curriculum and Supervision*, 3(1) 45-60.
- Unsworth, L. (2001). *Teaching Multiliteracies across the curriculum: Changing contexts of text and image in classroom practice*. New York: Open University Press.
- Unsworth, L. (2002). Changing dimensions of school literacies. *The Australian Journal of Language and Literacy*, 25(1), 62-77.

- Unsworth, L. (2006). Towards a metalanguage for Multiliteracies education: Describing the meaning-making resources of language-image interaction. *English Teaching: Practice and Critique*, 5(1), 55-76.
- Van Haaren, R. (2005). Innovation in Queensland education: Multiliteracies in action. In *Learning by Design* (pp. 257-283). Melbourne: Common Ground.
- Vasquez, O.A. (2006). A pedagogy of the future. *Pedagogies: An International Journal*, 1(1), 43-48.
- Victorian Curriculum and Assessment Authority (2005). *Victorian Essential Learning Standards: English*. Retrieved April 12, 2006 from <http://vels.vcaa.vic.edu.au/essential/discipline/english/index.html>
- Vidich, A.J., & Lyman, S.M. (1994). Qualitative methods: Their history in sociology and anthropology. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage.
- Virtual Learning (2003). *How do interactive whiteboards enhance learning?* Retrieved November 12, 2005 from [http://www.virtuallearning.org.uk/whiteboards/Learning\\_theories.pdf](http://www.virtuallearning.org.uk/whiteboards/Learning_theories.pdf)
- Vygotsky, L. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Walker, D. (2003, January 3.) Breath of life. *Times Educational Supplement*.
- Walsh, M. (2006). The textual shift: Examining the reading process with print, visual and multimodal texts. *Australian Journal of Language and Literacy*, 29(1), 24-37.
- Watson, D.M. (2001). Pedagogy before technology: Rethinking the relationship between ICT and teaching. *Education and Information Technologies*, 6(4), 251-266.
- Wilhelm, J., Baker, T., & Dube, J. (2001). Scaffolding learning. [Electronic version]. Retrieved 21, May 2007 from [www.myread.org/scaffolding.htm](http://www.myread.org/scaffolding.htm)
- Wilkinson, L. (2005). Improving literacy outcomes for students in disadvantaged schools: the importance of teacher theory. *Australian Journal of Language and Literacy*, 28(2), 127-137.
- Winn, W. (2002). Current trends in educational technology research: The study of learning environments. *Educational Psychology Review*, 14(3), 331-351.
- Wolcot, H.F. (1987). On ethnographic intent. In G.D. Spindler & L. Spindler (Eds.), *Interpretive ethnography of education: At home and abroad* (pp. 37-57). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Wolcott, H.F. (1999). *Ethnography: A way of seeing*. Walnut Creek, CA: Sage.
- Wood, C. (2001) Interactive whiteboards – a luxury too far? *Teaching ICT*, 1(2), 52-62.
- Wood, R., & Ashfield, J. (2007) The use of the interactive whiteboard for creative teaching and learning in literacy and mathematics: A case study. *British Journal of Educational Technology*, 39(1), 84-96.
- Wortham, S., & Jackson, K. (2008). Educational constructionisms. In J.A. Holstein & J.F. Gubrium (Eds.), *Handbook of constructionist research* (pp. 107-127). New York: Guilford.
- Wyatt-Smith, C., & Cumming, J. (1999). Examining the literacy demands of the enacted curriculum. *Literacy Learning: Secondary Thoughts*, 7(2), 19-31.
- Yin, R.K. (2003). *Case-study research: Design and methods*. Thousand Oaks, CA: Sage.
- Zevenbergen, R., & Lerman, S. (2007). Pedagogy and interactive whiteboards: Using an activity theory approach to understand tensions in practice. *Journal of Computer Assisted Learning*, 2(1), 102-117.
- Zhao, Y. (2003). What teachers should know about technology: Perspectives and practices. Greenwich, CT: Information Age.
- Zhao, Y., Pugh, K., Sheldon, S., & Byers, J.L. (2002). Conditions for classroom technology innovations. *Teachers College Record*, 104, 482-515.

# APPENDICES

## APPENDIX A IWB Questionnaire

### Teacher Survey

Thank you for taking time to answer these questions. All responses will be treated confidentially and can be placed in the attached envelope for collection. Should you wish to elaborate any further, please add further comments on the back of this sheet.

1. Do you like using Interactive Whiteboards for teaching purposes? Yes/No
2. What features in particular do you like/dislike? \_\_\_\_\_  
\_\_\_\_\_
3. If you were to transfer to another school without IWB's would you endeavour to get one in your classroom? Yes/No
4. If you had any family members or relatives attending school would you want them to have one in their classrooms?
5. If you were a child at this school would you want to have an IWB in your classroom? Yes/No
6. Do you feel supported by Administration to be able to use it effectively and efficiently?
7. Do you receive professional development to help foster your use of the IWB? Yes/No
8. Do you feel confident in using the IWB? Yes/No. If not, what do you think might help you become more confident? \_\_\_\_\_  
\_\_\_\_\_
9. What software packages are you comfortable and confident using? Please specify  
\_\_\_\_\_
10. Do you use your IWB every day of the Week? Yes/No If no, often many days of the week to you use the IWB for teaching purposes? \_\_\_\_\_
11. How many sessions per day do you use the IWB? Please circle  
One session                      Two sessions                      Three sessions
12. Are there any problems or restrictions that effect your use of the IWB? Yes/No. If yes please specify what these problems are. \_\_\_\_\_  
\_\_\_\_\_
- What Key Learning Areas do you use the IWB for? \_\_\_\_\_  
\_\_\_\_\_
13. Are there any Key Learning Areas for which you feel the IWB is not suitable? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
14. In what ways do you use the IWB's in your classroom teaching? Please provide some examples. \_\_\_\_\_  
\_\_\_\_\_

15. Do you specifically teach ICT skills and processes using the IWB? Yes/No
16. Do you find yourself offering different activities when using the IWB in comparison to prior to the IWB Yes/No. If yes, please specify \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
17. Do most students appear to be engaged and on task when using the IWB? Yes/No
18. What features do you feel engage students to a greater extent? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
19. What benefits do you think there are for students using IWB's \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
20. Do you feel the use of an IWB in the classroom contributes to learning? Yes/No?
21. If yes/no please explain why \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
22. Has using IWB's changed your teaching style? How? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
23. How do you see your role as the teacher when using IWB's? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
24. What do you see as the role of the students in the learning process when using IWB's?  
\_\_\_\_\_  
\_\_\_\_\_
25. How does this compare to your teaching when not using the IWB? \_\_\_\_\_  
\_\_\_\_\_
26. What sort of professional development do you see as important to help you and other teachers in the school develop and refine your use of the IWB? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Any Other comments you wish to make? \_\_\_\_\_  
\_\_\_\_\_



## APPENDIX B Multiliteracies Pedagogical Reflective Tool

<b>Contexts</b>						
<p>In each section there are two main statements.</p> <ul style="list-style-type: none"> <li>• <b>Statement one: An understanding/idea relating to multiliteracy pedagogy</b></li> <li>• <i>Statement two: A classroom implication</i></li> </ul>	This concept is new to me and I have no understanding of it.	I have some understanding of this concept but have not begun exploring ways of it informing my practice.	I understand this concept and have begun exploring ways of it informing my practice.	I am immersed in exploring this concept and it is increasingly informing my practice.	This concept is fully embedded in my understanding of the teaching of Multiliteracies and is informing my practice	HOW IS THIS INFORMING YOUR CLASSROOM PRACTICE? GIVE EXAMPLES
<p>Literacy is a social practice – the context in which the text will be used, its purpose and intended audience influence the choice of media and technology.</p> <p><i>A range of authentic examples of text are examined in relation to purpose, audience and context</i></p>						
<p><b>Students learn literacy both through their Primary Discourse and Secondary Discourses</b></p> <p><i>Teachers consciously consider the cultural capital and literacy resources that students bring with them to school. In many cases audits of home practices are done to determine what is valued.</i></p>						
<p><b>Students' experiences and backgrounds are valued and given importance</b></p> <p><i>Bridges are built between the literacies valued by students' homes and communities and those valued by the school. Teaching and learning activities are relevant and meaningful to students and acknowledge their diversity.</i></p>						
<p><b>Students need access to new forms of literacy and have the ability to use these new forms in changing contexts of operation</b></p> <p><i>Real life contexts are utilised for teaching reading. The different literacy practices that arise from the range of contexts in which individuals participate are made explicit.</i></p>						

<i>Understandings about Texts</i>						
<p>In each section there are two main statements.</p> <ul style="list-style-type: none"> <li>• <b>Statement one: An understanding/idea relating to multiliteracy pedagogy</b></li> <li>• <i>Statement two: A classroom implication</i></li> </ul>	This concept is new to me and I have no understanding of it.	I have some understanding of this concept but have not begun exploring ways of it informing my practice.	I understand this concept and have begun exploring ways of it informing my practice.	I am immersed in exploring this concept and it is increasingly informing my practice	This concept is fully embedded in my understanding of the teaching of Multiliteracies and is informing my practice	HOW IS THIS INFORMING YOUR CLASSROOM PRACTICE? GIVE EXAMPLES
<p><b>Texts are consciously constructed and have particular social, cultural, political and economic purposes.</b>  <i>Students explore purposes of texts eg to entertain, to persuade, to provide information, to aid in the completion of transactions. Students examine who constructed the texts and how the texts construct the world.</i></p>						
<p><b>A text may have several possible meanings.</b>  <i>Students are given opportunities to discuss/express what texts remind them of. They consider that their background/experience, the purpose and context as well as the author's conscious attempt to shape meaning all give rise to various meanings.</i></p>						
<p><b>Meanings are actively constructed by the interaction between reader and texts</b>  <i>Students are made aware that their interpretation of a text eg DVD relies not only on their ability to interpret multiple semiotic systems and modes, but their social and cultural knowledge and their knowledge and understanding of the social and cultural influences on the construction of the text.</i></p>						
<p><b>Texts continue to change as society and technology changes eg hybrid texts (composed of more than one genre of text)</b>  <i>Students explore intertextuality – the embedding in one text of elements of another</i></p>						
<p><b>Texts can incorporate a range of semiotic systems</b>  <i>Students investigate how the individual or combined semiotic systems of paper, electronic, live and multimedia texts convey meaning</i></p>						

<p><b>Texts can be multimodal, interactive and non-linear</b>  <i>Students examine texts comprising several modes that may need to be processed simultaneously eg mobile phones (reading, viewing - sending and receiving text, processing still and moving images) or Internet (hotlinks in websites enable multiple paths to be taken)</i></p>						
<p><b>Pedagogy</b></p>						
<p>In each section there are two main statements.</p> <ul style="list-style-type: none"> <li>• <b>Statement one: An understanding/idea relating to multiliteracy pedagogy</b></li> <li>• <i>Statement two: A classroom implication</i></li> </ul>	<p>This concept is new to me and I have no understanding of it.</p>	<p>I have some understanding of this concept but have not begun exploring ways of it informing my practice.</p>	<p>I understand this concept and have begun exploring ways of it informing my practice.</p>	<p>I am immersed in exploring this concept and it is increasingly informing my practice.</p>	<p>This concept is fully embedded in my understanding of the teaching of Multiliteracies and is informing my practice.</p>	<p>HOW IS THIS INFORMING YOUR CLASSROOM PRACTICE? GIVE EXAMPLES</p>
<p><b>1. Situated Practice/Experiencing</b></p>						
<p>Students are immersed in literate practices and topics that are part of their community context.  <i>Literacy activities include a range of multimedia and technology eg paper, electronic and live.</i></p>						
<p><b>Practical experiences draw on and incorporate students' prior school and out of school experiences and knowledge.</b>  <i>Students' reader identities are familiar to teachers and considered when planning. These include prior experience with texts, knowledge about texts, cultural knowledge and experiences, social knowledge and experiences, technological knowledge and experiences.</i></p>						
<p><b>2. Overt Instruction/Conceptualising</b></p>						
<p><b>Students learn of, through and about semiotic systems and literacies.</b>  <i>Opportunities are provided for students to interpret, produce a balanced range of various texts – oral, print and multimedia by writing, listening, speaking and viewing.</i></p>						

<p><b>Students develop a metalanguage to identify and explain differences in language and semiotic systems used in texts through explicit and focused learning episodes.</b></p> <p><i>The way semiotic systems create meaning individually and in combination are explored. These include auditory (music, sound effects, silence), gestural (facial expression, body posture), spatial (organisation of objects in a setting), linguistic (grammar, punctuation etc) and visual (still and moving images, page or screen layout).</i></p>						
<p><b>3. Critical Framing/Analysing</b></p>						
<p><b>Students examine the cultural and social context – audience, whose perspective, who benefits.</b></p> <p><i>Students are engaged in activities to develop their awareness that the selection, manipulation and inclusion of content in text can convey particular meanings and influence the reader.</i></p>						
<p><b>4. Transformed practice/Applying</b></p>						
<p><b>Multiliterate practice involves drawing upon available designs/resources (current literacy skills, knowledge and processes)</b></p> <p><i>Students are assisted to make links between the task in hand and other similar tasks in other contexts. For example ask, "Have I seen/used this type of text before and what do I know about its structure and sequence? Is there more than one semiotic system and do I need to engage with all of them in order to use this text effectively? How do the different parts of the text relate to one another?"</i></p>						
<p><b>Engaging in a multiliterate task (designing) involves using available designs in a way that best suits the achievement of the desired outcome.</b></p> <p><i>Students are made aware that the set of resources they bring to a task can be accessed to transfer strategies from one context to another ie they use their available resources in new ways to achieve the outcome.</i></p>						

Butler, S. (2003).

## APPENDIX C Home Literacy Survey (Students)

Name: \_\_\_\_\_

**Literacy Survey**  
Thank you for taking the time to answer the following questions!

### ABOUT YOU AND YOUR FAMILY

1. Are you a boy or a girl? Boy  Girl
2. Do you speak any language more than English at home? Yes  No  (Tick one)  
If yes, what language do you speak at home? \_\_\_\_\_
3. Do your parents speak English at home? Yes  No  (Tick one)  
If no what language do they speak at home? \_\_\_\_\_

### ABOUT YOUR LITERACY

4. Do you like to watch television? Yes  No  (Tick one) **If no, can you list any reasons why you do not like to watch television?** \_\_\_\_\_  
\_\_\_\_\_
5. How often would you watch television? Every Day  Sometimes   
Rarely  Never
6. What types of television shows do you like to watch? List some \_\_\_\_\_  
\_\_\_\_\_
7. Do you like to read? Yes  No  (Tick one) **If no, can you list any reasons why you do not like to read?** \_\_\_\_\_  
\_\_\_\_\_
8. How often would you read? Every Day  A few times a week   
Once a week  Once a month  Not very often
9. What do you read at home? (You may tick more than one)  
Books  Magazines  Instructions for games/competitions   
Newspapers  TV Guide  Road Signs  Other  Please specify \_\_\_\_\_
10. Do you borrow books from the local or school library?  
Yes  No  (Tick one)  
**If yes, how often would you borrow books?** Once a week   
Once a fortnight  Once a month  Not very often
11. How do you see yourself as a reader? Poor reader  OK reader   
Good reader  Very good reader

12. What do you think you have to learn to be a better reader? \_\_\_\_\_

13. Knowing how to read is ...Not very important  Sort of important   
Important  Very important

14. Do you think reading an Internet page is the same as reading a book?  
Yes  No

15. How is it different? \_\_\_\_\_

16. Do you think being a good book reader helps you when using the computer?  
\_\_\_\_\_

17. Do you have a computer at home? Yes  No  (Tick one)

18. Are you allowed to use the computer at home? Yes  No  (Tick one)

If yes, how often would you use it? Every Day  Twice a week   
Once a week  Once a fortnight  Once a month

19. If you do not have a computer at home, do you use one somewhere else?  
Yes  No  (Tick one) If yes, please specify where  
(eg. a friend's place, library)

20. How often would you use the computer elsewhere?

Every Day  Twice a week  Once a week  Once a fortnight   
 Once a month

21. What activities do you use the computer for? (You may tick more than one)

Computer games  Sending emails  Chatting (eg. ICQ, MSN Messenger)   
 CD Roms  Browsing the Internet   
Drawing  Encarta   
Word Processing (typing letters, assignments etc)   
Presentation packages (eg. Photostory, Powerpoint presentations)

22. If you use the Internet what websites do you visit? List some. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**23. What do you like about these sites?** (eg information, playing games, etc) \_\_\_\_\_

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APPENDIX D Multiliteracies Assessment Tool (Student)

Part A





Part B

The image shows a screenshot of a web browser window displaying an interactive educational page. The browser's address bar shows the URL: [http://www.ecokids.ca/pub/eco\\_info/topics/frogs/chain\\_reaction/index.cfm](http://www.ecokids.ca/pub/eco_info/topics/frogs/chain_reaction/index.cfm). The page features a navigation menu with options like 'Home', 'Help', 'About Us', 'Search', and 'Site Map'. Below this is a secondary menu with 'Play & Learn', 'EcoKids Club', 'Have Your Say', 'Eco-Calendar', 'Feedback', and 'Teachers & Parents'. The main content area is titled 'CHAIN REACTION' and includes an 'Instructions' section, a 'PLAY THE GAME' button, and a 'Start' button. A sidebar on the right contains 'MORE TOPICS', 'MORE ABOUT THIS TOPIC', 'Games & Activities', 'Curriculum Connections for teachers', and a 'RATE THIS GAME' section. A vertical navigation bar on the right side of the page has tabs for 'HOT TOPICS', 'TOPICS', 'BOOKS', 'LINKS', and 'GLOSSARY'. The Windows taskbar at the bottom shows the 'start' button, several open applications, and the system clock at 11:13 PM.

Labels A through H point to specific elements on the page:

- A**: Points to the 'PLAY THE GAME' button.
- B**: Points to the 'Game: Chain Reaction Size: 49 kb' text.
- C**: Points to the 'Start' button.
- D**: Points to the 'TELL A FRIEND' button.
- E**: Points to the 'GLOSSARY' tab in the vertical navigation bar.
- F**: Points to the 'MORE ABOUT THIS TOPIC' section in the sidebar.
- G**: Points to the 'TOPICS' tab in the vertical navigation bar.
- H**: Points to the browser's address bar.

**Questions for Assessment**

Name: \_\_\_\_\_

**PART A - Hoodwinked Website**

**1. What is the main purpose of the “Hoodwinked” website?**

- To advertise a DVD
- To advertise a book
- To advertise a movie

**2. Who would be MOST interested in this website?**

- Teenagers
- Children
- Adults

**3. Is this movie about real people?**

- Yes
- No

**4. Why have they used the picture of a girl, a granny, a wolf, and a woodcutter on this website?**

- They looked nice
- They are the characters in the movie/DVD
- They couldn't think of anything else to use for pictures

**5. Where would you enter the main page of the website?**

- G
- A
- C

**6. Where would you locate the address of this website?**

- E
- H
- I

**7. Why has the word “hilarious” been used?**

- There weren't enough words on the page
- To encourage people to buy the DVD
- To describe what the characters look like

**PART B - EcoKids Website**

**8. What is the main purpose of this website?**

- It is a page for learning
- It is a page for information
- It is a page for advertising

**9. What sort of person do you think created this website?**

- Mathematician
- Teacher
- Environmentalist

**10. Who would be interested in this website? (Tick as many as you think)**

- School children
- Parents
- Teachers
- Grandparents

**11. Where would you go to read instructions on how to play the chain reaction game?**

- C
- B
- A

**12. Are you able to go back to a previous web page?**

- Yes
- No

**13. What do you think you might learn from playing the chain reaction game?**

- Learn about the sun?
- Learn about how to build a food chain
- Learn about how to play games

**14. If you are trying to find information on a specific topic where would you go?**

- H
- G
- E