

## Literacy meets technology in the primary school: symbiosis of literacy and technology

**Karen McLean**

Australian Catholic University

### Abstract

This paper suggests that there exists a symbiotic relationship between literacy and technology. By symbiotic we mean a mutually beneficial relationship. Furthermore, this paper examines the discourse surrounding current political debate and curriculum reform in schools using the Victorian system as a case in point. In particular, it considers the integration of information and communications technology (ICT) into the English curriculum. Also, this paper describes the use of technology in the literacy programs of school based primary education. Traditionally literacy and technology have been considered pedagogically opposed, but this paper suggests that through the symbiosis of literacy and technology, the pedagogies surrounding the teaching of literacy and technology are mutually inclusive. Finally, the paper looks at the relationship between literacy and technology from both a research and practical perspective. It highlights the need for further research in this area, in order to explore implications of pedagogical practice supporting literacy development in the context of our rapidly changing and technologically advancing world.

### Introduction

The purpose of this paper is to share insights into the symbiotic nature of the relationship between literacy and technology in the early years of schooling. As noted by Locke and Andrews (2004) “while changes in technology have a role to play in the transformation of literacy, so new literate practices can serve to transform technology use” (p126). In the marine world small fish can be found taking shelter among jellyfish tentacles. These tentacles offer safe haven for the smaller fish who in turn act as bait for larger fish. In this example symbiosis has mutual

advantages. This paper suggests that we need to look at symbiosis between literacy and technology and the potential of this relationship to transform learning.

Arguments to explore symbiosis are not new. In fact the impetus for this paper stems from research into archives of literacy and technology discourse throughout the 1990s. In 1992 Bigum and Green drew attention to the tensions between prevalent literacy and technology pedagogies. In a political climate of economic rationalist viewpoints, literacy and technology were tied to employment opportunities and work. Bigum and Green (1992) argued for:

a cultural-critical perspective on both literacy and technology and a holistic view of the nexus between literacy pedagogy and the new technologies (p24).

Reference was given to three literacy paradigms; functional, critical and cultural. Lankshear, Snyder and Green (2000) describe a view of functional literacy that is tied to skill development:

being literate has been seen as a matter of cracking the alphabetic code, word formation skills, phonics, grammar and comprehension skills (p27).

This view of literacy puts forward that once essential skills have been mastered they can be used for employment and work. The second paradigm mentioned is critical literacy. Luke (1993) notes “literacy is about the distribution of knowledge and power in contemporary society” (p4). A critical literacy perspective embraces a paradigm that explores the power relationships existing between literacy and knowledge in society. Comber (2001) in reference to critical literacy emphasises that teachers in the early years of schooling can be troubled by the political nature of critical literacy as they already feel burdened by responsibility for literacy acquisition. The final paradigm mentioned is cultural literacy. Cultural literacy perspectives acknowledge the influence culture and community have on literacy learning. Lankshear, Snyder and Green (2000) state:

reading and writing can be understood and acquired only within the context of the social, cultural, political, economic and historical practices to which they are integral (p26).

A cultural literacy paradigm acknowledges diversity of cultural contexts and experiences that influence literacy development in children. Of these three literacy paradigms Bigum and Green noted that functional literacy prevailed as the literacy paradigm providing the strongest nexus between literacy and prescriptive technological discourses, through measurable outcomes and skill based content well suited to a ‘culture of compliance’ (p7).

By 2000, the need for a metalanguage for evolving multiliteracies was apparent (Unsworth, 2002) and the concept of critical literacy was expanded to multiliteracies through the work of The New London Group and others who recognised the “plurality of literacies” (Comber, 2001, p168). Prominent discourse continued to suggest evolving paradigms should include cultural–critical perspectives with due consideration to the notion of changing literacies and the changing dimensions of literacy (Lankshear & Knobel, 1997; Unsworth, 2002; Kalantzis, Cope & Harvey, 2003). In short, the rhetoric advocated the need to reconceptualise literacy (Kalantzis, Cope & Harvey, 2003; Zammit & Downes, 2002; Beavis & Durrant, 2001; Unsworth, 2002) and transform curriculum (Kalantzis, Cope & The Learning Design Group, 2005; Zammit & Downes, 2002) to meet the needs of the emerging knowledge society. Globalisation and continued advancements in information and communications technology (ICT) gave rise to new literacies; visual and digital literacies (Kalantzis et al., 2003; Lankshear & Knobel, 2006; Labbo, 2006). These new literacies required new skills and understanding, such as the ability to add a hyperlink to a web page, play an electronic game or read increasingly visual messages presented in different media forms.

It is clear that being literate today has changed, as a literate person needs to have control over a broad range of communication practices. Currently it seems there is mismatch between the old basics; reading, writing and arithmetic, and the technology revolution that has extended the boundaries of literacy to include multiliteracies and the new basics (Kalantzis, Cope & Learning by Design Group, 2005). Zammit and Downes (2002) state:

learning environments that encompass these new texts and technologies require the modification of existing teaching and learning practices and the generation of new practices (p27).

There seems to be no doubt that old basics remain important but there is also an urgent need to consider expanding notions of text and implications for pedagogical practice. Comber (2001) argues that schools should not offer “the simplistic and reductive” (p177) in the early years of schooling in a belief that children will have exposure and access to other literacies later. It seems timely that curriculum be transformed to address mismatch between old basics and the technology revolution by incorporating new basics and thereby encompassing communication practices beyond reading and writing.

## Current directions

In 2007, are we any closer to embracing pedagogical practices with the potential to transform learning through a holistic nexus of literacy and technology in what some might call the new basics or communication practices? Are we pioneering new doorways to literacy through pedagogical reform? Literature provides evidence that the educational community has picked up on the rhetoric but it would seem that in practice there is still some way to go. Throughout this paper I am attempting to pull together these threads to conceptualise a study.

The Victorian Essential Learning Standards (VELS) could be described as the face of the State Government of Victoria’s curriculum reform. In essence, VELS provides a framework for curriculum planning in schools. One of the key aims of this reform is to prepare students for:

a world which is complex, rapidly changing, rich in information and communications technology, demanding higher order knowledge and understanding, and increasingly global in its outlook and influences (Victorian Curriculum Assessment Authority, 2004, p2).

Within this curriculum document English is identified as a disciplinary strand of which traditional disciplines are a part. Technology, however, is labelled as an interdisciplinary strand; functioning within other disciplines and beyond the school (Victorian Curriculum Assessment Authority, 2005). The clear distinction between the placement of English

and technology in separate strands highlights key government strategy to interweave technology across the curriculum. Paradoxically, assessment and reporting by schools to the Department of Education and Training in Victoria remains skills and content generated in the form of continued Achievement and Improvement Monitoring (AIM) testing. The contradictions are abounding in government documents. The fact that the strand is called English instead of Literacy or Language highlights our confusion with current jargon. English maintains a traditional skill based, functional underpinning which some may argue is highlighting limitations in Victorian Government thinking. Literacy or Language implies broader communication and social practices more in line with the current discourse. Kalantzis, Cope & Harvey (2003) draw our attention to the need to reframe English to encompass communication practices, reminding us that by our choice of words literacy can mean “something new, something appropriate to new learning” (p22), or something old, something inappropriate. It should be acknowledged that the notion of English as it is commonly viewed carries an aesthetic interpretation and some would argue that replacing ‘English’ with ‘literacies’ is reductionist. Others such as Comber (2001) point out that by acquiring a range of literacies “aesthetic, ethical, cultural, moral stances, views about knowledge, ways of working, organizing, thinking and interacting” (p177) makes learning significant. It is not the purpose of this paper to explore this notion but it is important to recognise that alternative viewpoints exist.

In Victoria, in 2007, what is the evidence that schools are adopting holistic approaches to the infusion of technology in the literacy program? In this paper the use of the term ‘holistic approaches’ refers to approaches to teaching and learning that encompass all areas of literacy; ‘old basics’ and ‘new basics’ within an integrated framework whereby meaningful learning occurs across all fields. Furthermore, the infusion of technology in the literacy curriculum implies an approach whereby technology is seamlessly a natural part of meaningful literacy learning experiences. This is the kind of pedagogical shift that is sought but not necessarily attained through current curriculum reform.

Despite the current rhetoric and push in the direction of curriculum reform – Locke and Andrews (2004) remind us that literacy and

technology transform each other through symbiosis – it appears that in reality technology continues to be implemented as an ‘add on’ rather than an ingredient of literacy in the classroom. In fact, for schools and educational institutions in Victoria, the current rhetoric has made evident that transformative curriculum requires more than government mandates: it requires a change in pedagogical approach through the implementation of supportive frameworks and professional learning that develop teacher understanding of the symbiosis of literacy and technology. Kalantzis, Cope and The Learning Design Group (2005) remind us: “transformative curriculum, attempts to cater more consciously, directly and systematically to difference amongst learners” (p60). In practice, technology as part of teaching repertoire is essential, as the lifeworld experiences of the learner go beyond textbooks to incorporate many multimodal texts and other forms of communication. In order to cater for difference amongst learners, connections between lifeworld experiences and ‘English’ must be made, to be truly described as transformative curriculum (Kalantzis, Cope and The Learning design Group, 2005).

In 1992 Bigum and Green alluded to the preoccupation of schools to spend large budgets on the purchase of technology:

the willingness of schools to purchase more products and to continually and regularly upgrade both hardware and software, something that would be unimaginable in any other area of school expenditure (p9).

As each year progresses we must consider whether schools have moved beyond this, and are strategically putting resources into addressing the urgent necessity to explore notions of transformative learning through pedagogical shift; embracing the potential of a mutually beneficial relationship between literacy and technology.

My experience suggests that this much needed pedagogical shift is yet to occur on a large scale in the Victorian education system. Old pedagogy views technology as an ‘add on’ whereas new pedagogy views technology as central to all learning. Current literature on the symbiosis of literacy and technology suggests there is good reason for a continued focus on old pedagogical approaches. One problem already alluded to is the need for schools to reconsider the allocation of resources to staff support and

ongoing professional development. Other writers suggest further complexities associated with the current lack of uptake. Labbo (2006) describes a need for learning communities to be established; such communities would include principal, staff and university researcher. Andrews (2004a) also argues that the establishment of effective learning communities is more important than the technology itself. It would seem that a commitment by schools to work together with technology in a learning community would encourage pedagogical reform to occur at the school level as teacher ideologies and practice seem to matter more than access to current technology (Andrews, 2004a). Thus, educators need support to move beyond the use of technology to support literacy programs towards embracing the symbiotic relationship between the two. Again, it is not about the money spent on technology; innovation on old technology can be transformative as can innovation on new. If transformative literacy education is the goal then the emphasis should be on the development of pedagogical frameworks and practices that will evolve and adapt to the ever changing technological world that we live in and enable educators to experience the mind shift that is necessary to embrace and infuse the literacy curriculum with technology. Writers suggest literacy practices in new learning environments should develop through the merging of existing teaching and learning practice with new (Zammit & Downes, 2002). Also, as we experience the push in this direction, the use of technology needs to support new and enhance old literacies, until holistic alignment between theory, practice, policy and assessment occurs (Labbo, 2006).

## Insights

This paper argues that we need to look closer at the transformative nature of the symbiotic relationship between literacy and technology in the early years of schooling because of the potential of this relationship to engage students in learning. Insights gained stem from an initial interest in pushing the perceived boundaries of literacy and technology in the early years classroom with respect to emerging themes in current literature. It has been my experience that teachers in early years classrooms in Victoria have tended to use technology in the literacy session only in so far as it provides a learning centre activity, phonics or literacy skill practice. Research has suggested similar findings across other primary schools (Andrews, 2004; Labbo, 2006). My concern with

this approach to technology in the literacy program is that the technology was used to support the literacy program as a tool, but did not go beyond this to harness the symbiotic relationship between literacy and technology and transform learning. Alarming, in classrooms where technology was used merely as a support tool for literacy development a mismatch between the uses of technology at school and at home was evident. This cultural disparity has been highlighted by other researchers in this field (Beavis, 2003; Kalantzis & Cope, 2005; Unsworth, 2001; Hurrell, Sommer & Sarev, 2001; Lankshear, & Knobel, 1997) whereby school use of computers is criticised as being limiting and controlled, in contrast to home and community use of computers which is considered to be exploratory and fun.

In an effort to harness some of the natural curiosity that students have for technology outside of school and bring this into the literacy program I initiated a partnership with a like minded colleague who had a similar interest in this area. Through a project approach we sought answers to the following question:

How can technology be a doorway to literacy in the early years?

My teaching background in technology and literacy coupled with reading of current literature in this area, challenged me to initiate further exploration of the symbiotic relationship between literacy and technology. Kalantzis, Cope & the Learning Design Group (2005) describe a need to actively harness the potential of digitised technologies in new learning environments; the view being that digitised technologies will become central to all learning. It would seem that students learn or perceive now differently to and from traditional ways. This may eventually require us to consider methods of assessment and reporting that are aligned to new learning paradigms but this is a topic for further study. Through reading current literature we could see that the answers we were seeking would only be found if we were to push the boundaries of our current understandings and use of technology in the literacy session. To get to the essence of insights gained through this project I would like to present two case studies. Locality and names have been altered for research purposes.

## Case Study 1

The focus of this case study was a Year 2 boy who was tuning out of the literacy session on a regular basis, through non-attendance, and the use of behavioural and avoidance strategies. The challenge for the partnership was to engage him in literacy learning using technology. Our definition of engagement has been encompassed by the Fair Go Project; a joint research initiative by the NSW Department of Education and Training and the University of Western Sydney who describe engagement as occurring on an operative, cognitive and affective level:

Student engagement operates at cognitive (thinking), affective (feeling) and operative (doing) levels ... It is not just students doing things but it is something happening inside their heads ... when students are strongly engaged they are successfully involved in tasks of high intellectual quality and they have passionate, positive feelings about these tasks. (NSW Department of Education and Training, 2006, p10)

If in our partnership we could engage Jake in literacy at an operative, affective and cognitive level using an approach that harnessed the symbiotic relationship between literacy and technology then we would gain valuable insights into its potential to act as a doorway to literacy.

### Jake's history

From the first day of school it was clear that Jake would rather be somewhere else; he chose to sit away from his peers and did not participate in classroom activities. In Victoria at this time, the Early Years literacy program was implemented in all state schools (Department of Education, Employment and Training, 1999). Jake entered the Reading Recovery program in year one and also received level 2 government funding for a teacher aide in his second year of schooling. In Year 2 his literacy levels were deemed to be well below that of his peers. At the beginning of this project Jake was often absent from school and when in attendance the classroom teacher had great difficulty in getting him to read or write anything.

## Preparation

At this point of the project I was part of a team that had taken teacher professional leave to explore the potential of electronic whiteboards in the classroom. Applying key considerations from this action research project (McLean, McKay, Baltetsch, Ottrey, 2006) we set up an electronic whiteboard in the classroom. In an effort to maximise the learning potential the board was set up in a part of the room that could be used for whole group, small group, individual and paired work. In short, it was not the focal point of the classroom.

## The project

As noted above Jake's learning needs were evident from the beginning. We believed we needed to engage him in literacy learning. More immediately we needed to get him reading and writing anything. Our first insight came early in the project. Jake had observed his teacher using the electronic whiteboard and was eager to play with it himself. It is important to note at this point that Jake did not have a computer in his home and his access to modern technology outside of school was limited compared to that of his peers. Our experience told us that Jake's minimal interaction with others and sitting alone indicated a lack of involvement with his peers, so we allowed him to use the board on his own whilst the rest of the class worked on other tasks. Initially it appeared Jake just wanted to write on it. He wrote his name and asked the teacher to convert it to text. The program did not recognise his name because he did not form the letters correctly. We expected this to deter him from continuing but on the contrary he was determined to have the program recognise his handwriting and convert it to text. Perhaps the teacher modeling this process had captured his attention and desire to achieve success. After many more unsuccessful and undeterred attempts we used the recording device on the electronic whiteboard to record the letter formations accurately. Jake then copied the model as it replayed over and over until he could form the letter. He then asked to exit the recording program so that he could try and record his name again. This time it worked and oh what joy! Here was a child who had been at school for over two years and could not write his name accurately. In less than 10 minutes he was able to achieve a small piece of literary success! What was also surprising about this result was Jake's

ability to remember and work through the steps needed to get text recognition:

Step 1 – Write his name

Step 2 – Put the pen down and click the select tool

Step 3 – Select the handwritten text

Step 4 – Click on the down arrow

Step 5 – Look down the list of options and identify correct conversion

Step 6 – Select the correct conversion

Previously, a recommended strategy for assisting this child with learning was to keep instructions and steps to a minimum. With motivation and engagement Jake was able to remember and repeat at least six steps in sequence.

This small breakthrough for Jake gave us the impetus to expand the use of technology in the literacy session. What was evident from this incidental moment was the use of technology in an authentic context. Durrant and Green (2000) emphasise the importance of authentic context, form and purpose of learning when using technology in the classroom. In this example Jake was motivated to write his name because he wanted to use the new technology. Repetition of this task using pen and paper in the classroom had been unsuccessful; there was no authentic purpose behind it as he could recognise his recording as his name. Technology in this instance provided motivation, appropriate form and interaction; consistent reinforcement and confirmation that he could do it. There was finally a purpose behind the task as Jake had to improve his handwriting so that the technology would work.

Building on his initial motivation we set out to enrapture Jake in literacy learning. The next step was to immerse him in reading, writing, listening and speaking with technology. One possibility was to bring language experience and the Reading Recovery strategy of the cut up sentence to life on the electronic whiteboard. The students in the class had recently visited Sovereign Hill in Ballarat and were busily making class books to share their experiences. We decided to develop an electronic cut up

sentence and an e-page with Jake. Using the electronic whiteboard Jake selected his photograph and inserted it into the electronic whiteboard program. The teacher scribed his sentence for him and he converted it to text. In the next stage of the sentence building process Jake copied the sentence word by word underneath the teacher model. After each word he converted it to text so that these words could be manipulated on the page. Once he had completed this task he was able to shuffle up the words himself, reassemble and read aloud his sentence, with and without the teacher model to direct him. It should be noted that Jake had undertaken physical manipulation of words on paper in the Reading Recovery program and classroom with limited success.

Following this activity Jake worked with the teacher in PowerPoint to insert a Quick Time movie of himself at Sovereign Hill, a voice recording, another photograph and a hyperlink to his electronic cut up sentence. With the click of a button a colour copy of Jake's work was printed out in duplicate, providing one copy to display and one to share with his family.

Could Jake's learning have been achieved any other way? I would suggest that the answer to this question is no. What was evident here was authenticity of learning in a workable time frame. In this example authenticity refers to having a purpose that is considered real and relevant by the learner. For instance, the activity described has been carried out before with pen and paper and Jake's attempts were unsuccessful. This sentence making activity enabled Jake to engage in learning in a multimodal way, using audio, image and interactivity. This level of multimodality was not typical of usual sentence work and vital to his level of engagement in the task. Some of Jake's motivation and encouragement was related to the mystery of technology; but engagement was through psychomotor skills for manipulation, affective through his enjoyment, and cognitive to follow steps and problem solve. It would seem that technology provided the speed, memory and automation necessary for the student to achieve success. In short, multimodality and the way the technology was integrated provided for student learning.

At the conclusion of this session Jake was eager to share his work with his classmates. In a rare moment, not even the recess bell could deter him from sharing his work with his peers. Using technology with authentic purpose and context Jake was able to read, write, speak in front of his peers, listen and respond to questions about his work. This was quite an achievement! Following his class presentation Jake's attitude to learning changed. He began to attend school on a regular basis and to display a real interest in learning. For our partnership the significance of the infusion of technology into the literacy session was apparent. It provided real context for technology underpinned with notions of literacy as communication practices. As Durrant and Green (2000) remind us: "the importance of the word and the printed page remains, but such importance is being transformed in relation to new technologies, new cultures and new forms of life" (p95). Jake had provided us with an insight into what this transformation looks like in the early years classroom.

## **Case study 2**

Further insights into technology as a doorway to literacy were gained through a second project. My partner teacher had been a participant in another research project; Partnerships in Information and Communications Technology Learning (PICTL). The PICTL project in Victoria aimed to expand teachers' (and pre-service teachers') knowledge, understanding and skills in ICT in education through partnerships (McNamara, McLean, Jones, 2006). Key findings from this project and others with a similar focus (Lee, 2006) suggest that teachers need to be able to focus on curriculum and the learning needs of children, with technology being a natural part of this rather than an add on. A similar view is put forward by Labbo (2006): "It is clear that new technologies will not automatically transform classrooms if teachers are not comfortable using them for educational purposes" (p206). Through her involvement using the supportive partnerships model used in the PICTL project the partner teacher developed an openness and willingness to embrace technology and continue to build on her existing understandings.

The Victorian PICTL project identified the following principles for successful technology professional development partnerships:

- Partnerships work better if partners are of a similar ICT skill level
- Learning should begin where the partnership is at on the learning continuum
- Critical reflective practice is important
- Authentic context for partnership learning and student learning is essential
- A framework supports pedagogical growth and development.

In planning for the infusion of ICT into the literacy session we decided to apply these principles to our partnership.

For the purposes of this paper I have chosen to detail one perspective. Boys and literacy have been an ongoing concern for educators at all levels of the schooling system and in the Year 2 classroom engagement of boys in literacy continued to be an issue. In our partnership we decided to explore the potential of technology to provide doorways to literacy with a group of Year 2 boys. The genre focus in the classroom was fairy tales and the teaching and learning unit was to culminate with the presentation of a class book of fairy tales. For some of the boys in particular, creative writing and fairy tales were not a popular choice. However, residing in the classroom was a family of stick insects. The alien appearance of these insects had provided scientific interest for a group of boys. We wanted to harness this level of interest in the literacy program, so we decided to use the stick insects in the children's fairy tales. The children were placed in groups of three and using a storyboarding technique with cut out characters, settings and objects they created a fairy tale. The story boards were organised into beginning, middle and end and a template for the recording process was given to each group. Once this task was completed orally the children recorded it using the electronic whiteboard. A screen capture of the electronic whiteboard story board is provided in Figure 9.3 below.

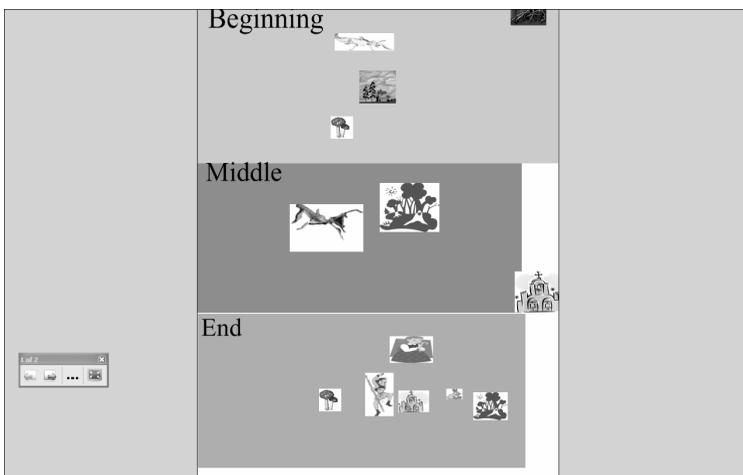


Figure 9.1: Screen capture of story boarding activity

The children recorded their voices and manipulations of objects on the story boards as each student told their story. When each group had completed this task a share time was provided. Children listened to each group presentation and provided feedback to each other on the task. What was evident from this activity was the high levels of motivation displayed by the children, to not only complete this task, but to do it to the best of their ability. With regard to the formal literacy objectives the activity provided evidence that all groups had successfully developed narrative structure; beginning, middle and end, and the peer feedback suggested a further need to add appropriate vocabulary to the fairy tales to make them more interesting. The presentations became a catalyst for deeper learning, as students were given the opportunity to critically reflect on their own contribution and that of others. Holistic approaches to social learning were inherent in the task. The time element was also present again in this example technology integration. With the practicalities of the task integrated into a technological framework, time was not wasted dealing with peripherals and organisational details. In particular, provision for peer feedback and affirmation were important aspects for building on student learning. Ownership of the task and control of the technology was placed in the hands of the students. Given this level of control over the task development and presentation, students were provided with an authentic context and purpose and a

form of presentation that encouraged critical reflection on their own work and on the work of others.

## Conclusions

Evident in both case studies was an authentic context and purpose for the use of technology in the literacy program. Research suggests systematic use of technology in the literacy session does not necessarily mean that students will be better prepared for the ever changing world they will live in (Beavis, 2003). It has been my experience that teachers will embrace change if they see benefits for student learning. Insights from my partnership with another like minded teacher suggest that given an authentic context and purpose for teacher professional learning and extending this into the classroom to enable the use of technology to be driven by student learning needs can result in pedagogical shift. Turbill (2003) notes the ongoing concern that teachers in the early years of schooling are not embracing technology in the classroom. My experiences would support this concern, but the insights gained from reading literature in this area and my involvement in small scale action research projects suggests that if professional development for educators focused on deepening teacher understanding of the symbiosis of literacy and technology the pedagogical shift is possible.

## References

- Andrews R (2003). ICT and Literacies: A new kind of research is needed. *Literacy Learning in the Middle Years*, 11(1): 9–12.
- Andrews R (Ed) (2004). *The Impact of ICT on Literacy Education*. London: RoutledgeFarmer.
- Andrews R (2004a). Where next in research on ICT and literacies? *English in Australia Number 139, Literacy Learning: the Middle Years*, 12(1): 58–67.
- Beavis C (2001). Expanding notions of text. In C Durrant & C Beavis (Eds), *P(ICT)ures of English: Teachers, Learners and Technology*, (pp145–161) Kent Town, SA: Wakefield Press.

- Beavis C (2003). Critical engagement: ICTs, literacy and curriculum. *Practically Primary*, 8(1): 39–44.
- Bigum C, Green B (1992). Technologizing literacy: The dark side of dreaming. *Discourse*, 12(2): 4–28.
- Comber B (2001). Critical literacy: Power and pleasure with language in the early years. *The Australian Journal of Language and Literacy*, 24(3): 168–181.
- Durrant C, Green B (2000). Literacy and the new technologies in school education: Meeting the l(IT)eracy challenge? *The Australian Journal of Language and Literacy*, 23(2): 89–108.
- Durrant C, Beavis C (2001). A p(IC)ture is worth ... In C Durrant & C Beavis (Eds), *P(IC)tures of English*, (pp1–11). Kent Town: Wakefield Press.
- Durrant C, Beavis C (Eds) (2001). *P(ICT)ures of English: Teachers, Learners and Technology*. AATE Interface Series. Kent Town: Wakefield Press.
- Early Years of Schooling Branch, DoE, Employment and Training (1999). Early Years Literacy Program. EaT Department of Education, Victoria, Longman.
- Hurrell G, Sommer P, Sarev J (2001). Cyber English and the new classroom aliens. In C Durrant, C Beavis (Eds), *P(IC)tures of English. Teachers, Learners and Technology*, (pp175–190). Kent Town: Wakefield Press.
- Kalantzis M, Cope B, Harvey A (2003). Assessing multiliteracies and the new basics. *Assessment in Education*, 10(1): 15–26.
- Kalantzis M, Cope B, Learning Design Group (2005). *Learning by Design*. Melbourne: Victorian Schools Innovation Commission in association with Common Ground Publishing Pty Ltd.
- Labbo L (2006). Literacy pedagogy and computer technologies: Toward solving the puzzle of current and future classroom practices. *Australian Journal of Language and Literacy*, 29(3): 199–209.
- Lankshear C, Gee J P, Knobel M, Searle C (1997). *Changing Literacies*. Buckingham: Open University Press.

- Lankshear C, Knobel M (1997). Literacies, texts and difference in the electronic age. In C Lankshear, J P Gee, M Knobel, C Searle (Eds), *Changing Literacies*, (pp133–163). Buckingham: Open University Press.
- Lankshear C, Knobel M (2006). *New Literacies: Everyday Practices and Classroom Learning, 2<sup>nd</sup> Edn*. Berkshire, England: Open University Press.
- Lankshear C, Snyder I, Green B (2000). *Teachers and Technoliteracy: Managing Literacy, Technology and Learning in Schools*. St Leonard's: Allen and Unwin.
- Lee K (2006). Online learning in primary schools: Designing for school culture and change. *Educational Media International*, 43(2): 91–106.
- Locke T, Andrews R (2004). ICT and literature: A Faustian compact. In R Andrews (Ed), *The Impact of ICT on Literacy Education*, (pp124–152). London: RoutledgeFalmer.
- 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*, (pp1–92). South Melbourne: Macmillan Education Australia Pty Ltd.
- McLean K, McKay C, Baltetsch R, Ottrey A (2006). *E-Learning – Interactive Whiteboards. Knowledge Bank Report for Teacher Professional Leave*. Melbourne: Department of Education and Training.
- McNamara S, McLean K, Jones M (2006). *Partnerships for Information and Communications Technology in Learning Final Report. Stories in ICT Professional Development: A Victorian Case Study*. Canberra: Department of Education, Science and Training.
- NSW Department of Education and Training & University of West Sydney (2006). *School is for me: Pathways to student engagement. Fair Go Project*. Sydney: University of West Sydney.
- The New London Group (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, 66(1): 60–92.
- Turbill J (2003). Exploring the Potential of the Digital Language Experience Approach in Australian Classrooms. *Reading Online*. Available at [www.readingonline.org/international/turbill7/](http://www.readingonline.org/international/turbill7/)

Unsworth L (2001). *Teaching Multiliteracies across the Curriculum: Changing Dimensions of Text and Image in Classroom Practice*. Buckingham: Open University Press.

Unsworth L (2002). Changing dimensions of school literacies. *Australian Journal of Language and Literacy*, 25(1): 62–77.

Victorian Curriculum and Assessment Authority (2005). *Victorian Essential Learning Standards Overview*. Melbourne: Victorian Curriculum and Assessment Authority.

Victorian Curriculum and Assessment Authority (2004). *Introducing the Victorian Essential Learning Standards*. Melbourne: Victorian Curriculum and Assessment Authority.

Walsh M, Asha J, Spranger N (2007). Reading digital texts. *Australian Journal of Language and Literacy*, 30(1): 40–53.

Zammit K, Downes T (2002). New learning environments and the multiliterate individual: a framework for educators. *Australian Journal of Language and Literacy*, 25(2): 24–36.