A Contested Space: the dialogic intersection of ICT, multiliteracies, and early childhood

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ABSTRACT If students are to be equipped with skills necessary to meet the challenging and diverse demands of different forms of communication brought about by the introduction of new technologies, then a broader definition of literacy is required. A pedagogy of multiliteracies recognises that there are multiple modes of representation that communicate meaning beyond language alone. As debate on information and communication technology (ICT) integration and literacy definition intensifies, early childhood teachers contemplate how they will accommodate these changes. How will early childhood education facilitate young children’s use of ICT to support multiliteracies learning? This study investigated how two Western Australian teachers integrated ICT to support multiliteracies learning in early childhood classrooms. Two case studies, constructed over a nine-month period and employing ethnographic methodology, illustrated how different curricular, pedagogical, and classroom designs impact on children’s early literacy experiences. An analysis across the two cases illuminated how different pedagogy, definitions, support, resources and curriculum shaped the dialogic intersection of ICT and multiliteracies in early childhood education.

Introduction

In 1996, the New London Group presented their manifesto, 'Pedagogy of Multiliteracies: designing social futures', which advocated change in literacy teaching for the twenty-first century. The authors claimed that if students are to be equipped with skills necessary to meet the challenging and diverse demands of different forms of communication brought about by the introduction of new technologies, then a broader definition of literacy was required. Furthermore, it was argued that schools’ traditional approaches to language instruction not only failed to recognise the complex reality of communications in today’s multimedia world, but also often excluded the resources of students of different linguistic and cultural backgrounds.

Outside the classroom young Australians 'are increasingly exposed to different forms of media and technology' (Australian Communications and Media Authority, 2009, p. 29). How will teachers integrate these information and communication technology (ICT) experiences to support and enrich early literacy learning within the classroom? New ways of reading the world (Freire, 1972) now challenge teachers to reflect critically on their teaching practice and to contemplate how they will accommodate new literacies in their practice.

The present research study investigated how information and communication technology (ICT) supported multiliteracies in Western Australian early childhood education. The ethnographic study of two early childhood classrooms captured, through rich description, the culture of individual early childhood settings and their unique ‘communicational landscapes’ (Kress, 1997, p. 61). An analysis across the two cases illuminated how different pedagogies, definitions, support, resources and curricula shaped the dialogic intersection of ICT and multiliteracies in early childhood education.
The study suggests that there is no one prescriptive model for the integration of ICT in early childhood education. Rather than discovering the most effective pedagogy for integrating ICT in early childhood settings, the findings from this study illustrate how any instructional context is subject to multiple realities and constraints, and must be actively negotiated. I document the complexities of two early years literacy learning settings, including school ideologies, teacher pedagogies, and available resources. These spaces are shaped by vested interests and contesting definitions of what constitutes high-quality early years literacy learning experiences. To facilitate the reader's understanding of the research context the following background information is presented.

**Background of Research**

In 2004, four Western Australian early childhood teachers volunteered to participate in a national action research project, A Pedagogy for Multiliteracies with Information and Communication Technologies in Early Childhood Education (2004-2006), to determine the most effective pedagogy for ICT use in Australian early childhood education. I was granted an Australian postgraduate award to complete independent research that contributed further insight to the project findings. My fieldwork observations in one classroom were used to construct the first case study presented in this article.

My interest in the affinity of a pedagogy of multiliteracies and the Hundred Languages of Children, a philosophical construct underpinning the Reggio Emilia teaching approach, led me to contact the principal of a small independent school (hereafter referred to as Bridgewater Community School) to include additional early childhood classrooms in my study. The teachers at this school were neither familiar with the term multiliteracies, nor involved in the action research project. Fieldwork in an early childhood classroom at this school was used to construct the second case study presented in this article.

While I draw rhetorical contrasts between two metropolitan schools to discuss the impact of school culture and teacher participants' pedagogical considerations on the integration of ICT in early childhood education, it must be emphasised that these contrasts are not intended to devalue teacher or school efforts to support early years literacy learning. Different interpretations of what constitutes 'appropriate' pedagogy for young Western Australians reflect different epistemologies, ways of looking at the world and making sense of it. As this study illustrates, different perceptions of early childhood education and the available resources within each school impact ICT integration. In later sections of the article I will present two case studies that illuminate how these differences shape students' multiliteracies learning experiences.

**ICT in Early Childhood Education**

The European Commission has defined ICT to establish shared understandings and facilitate discussion on the nature of the digital divide. They issued the following definition:

> [ICT] is a term, which is currently used to describe a wide range of services, applications, and technologies, using various types of equipment and software, often running over telecom networks ... technologies can be said to include a broad array ranging from 'old' technologies such as radio and TV to 'new' ones such as cellular mobile communications. (European Commission, 2001, p. 3)

This definition, inclusive of both new and old technologies, is relevant for those across the education spectrum including its youngest members, those in early childhood contexts. The European Commission (2001) insists that, 'the importance of ICTs is not the technology as such, but its enabling function in access to knowledge, information and communications, increasingly important elements in today's economic and social interaction' (p. 3). The enabling function of technologies in Western Australian early childhood education curriculum remains largely dependent on teacher preference.

Over the past decade Australian reform initiatives have targeted education policies as a means of implementing ICT innovation and change in schools to facilitate 'new learning and students' capacity for imagination, creativity and improvisation' (Arnold & Ryan, 2003, p. 13). According to
the CEO Forum on Education & Technology (2000) the following processes can support the effective integration of ICT in early childhood education:

- Authentic and challenging tasks are the catalyst for inquiry;
- Projects are carried out in heterogeneous, collaborative groups;
- The teacher is coach and facilitator rather than transmitter of information;
- The learning process is student-centred rather than teacher-centred;
- The students work for extended periods of time;
- Students scaffold each other receiving support from their teacher;
- Projects require additional time to be spent on activities;
- There is a need for ‘just in time’ ICT support to assist with technical glitches;
- Collaboration between staff is important; and
- The principal’s direct involvement as mentor, guide and facilitator is critical.


Siraj-Blatchford & Siraj-Blatchford (2001) deem ICT ‘appropriate’ for young children if it has ‘the characteristics of communicating information and promoting interactivity’ and is ‘educational’ (p. 5). Resources that can communicate information include: audio and video equipment, digital cameras, printers, projectors, desktop and laptop computers, hand held or notebook computers or graphic tablets, scanners, and interactive whiteboards. ICT that can promote interactivity includes: programmable and radio-controlled toys, musical keyboards, talking toys, electronic activity centres, books that incorporate music or other recorded sounds, computer software, and children’s websites (Siraj-Blatchford & Siraj-Blatchford, 2001, pp. 3-4).

While the integration of ICT has the capacity to engage young children to learn in ‘new and dynamic ways’ (Yelland, 2001, p. 3), the extent to which school culture and teachers’ pedagogical considerations impact on how ICT can support multiliteracies in the early years remains an under-researched area, one this article begins to address.

A Pedagogy of Multiliteracies

‘A Pedagogy of Multiliteracies: designing social futures’ (New London Group, 1996) invites teachers to reflect critically on how different curricular, pedagogical and classroom designs might invite and create different sorts of learning, and how students’ cultural and linguistic diversity is accommodated and supports 21st-century modes of communications. The authors challenge teachers to consider,

in a world where the fundamental mission of educators is to improve every child’s educational opportunities ... what constitutes literacy teaching in the context of the ever more critical factors of local diversity and global connectedness?’ (New London Group, 1996, p. 3)

A multiliteracies approach can improve educational opportunities through the integration of ICT in student learning and its accommodation of cultural and linguistic diversity. Advancements in ICT can provide students with ready access to an outside world where exposure to new literacies cannot be contained. Within the early years classroom, however, opportunities to explore new literacies using ICT may be overshadowed by government directives to raise alphabetic literacy standards through traditional approaches to language instruction. It may be possible, however, that ICT can provide a classroom space that not only supports the development of print knowledge, but also of literacies that reflect the advances of a global world.

A multiliteracies pedagogy invites new ways of reading the world through visual, aural, gestural, spatial, and linguistic modes of meaning. This involves ‘talking about language, images, texts and meaning-making interactions’ (Cope & Kalantzis, 2000, pp. 23-24). It requires time to explore available designs of meaning, space for active designing processes, and resources with which children can create redesigned constructs of meaning that express personal meaning and have cultural and linguistic significance. The epistemological assumptions underpinning the multiliteracies theoretical perspective are that mainstream education accommodates pluralism. As illustrated in the two case studies presented in this article, how a multiliteracies approach is taken up is dependent on school culture, teacher pedagogies, and constraints such as the availability of resources. While a multiliteracies approach can supplement ‘traditional literacy pedagogy’ it also
requires ‘letting go of long-cherished tenets of teacher authority’ (Cope & Kalantzis, 2000, p. 5; Luke, 2000, p. 90). The integration of ICT to support multiliteracies learning in early childhood education requires a ‘teacher predisposition, and expertise and teaching goals’ receptive to social constructivist learning principles’ (Lloyd, 2005, p. 13). It might also require structural and administrative supports. As the case studies presented in this article suggest, teacher practices cannot be isolated from how particular approaches are presented (for instance, whether these are teacher-generated inquiries or top-down mandates) and from the affordances or constraints of different school settings.

**Methodology**

This research used ethnographic methods, including extensive participant observation, to examine the integration of ICT to support multiliteracies across different early childhood settings. I was mindful that in conducting ethnographic inquiry, I needed ‘to recognise that different people ... inhabit quite different worlds’ and that, ‘their different worlds constitute for them diverse ways of knowing, distinguishable sets of meaning, separate realities’ (Crotty, 1998, p. 64). My fieldwork involved attending research sites once every two weeks, and also included additional days when I was invited to observe students using ICT. Semi-structured interviews provided me with the opportunity to discuss participants’ pedagogy, teaching approach, curriculum, resource provision, and level of support.

While preliminary analysis of data occurred concurrently with fieldwork, when classroom visits concluded there was time to step back from my close interrogation, to consider the data collectively. I would later search the data for cultural themes unique to each ECE setting. I appreciated that making sense of the data collected involved a staged process completed over an extended period of time. In a postmodern tradition, I acknowledged, ‘there is no blue print for qualitative analysis’ but that it ‘should be in keeping with the researchers’ epistemological and ontological assumptions underpinning his/her research’ (Hall, 1999, p. 20).

Vignettes, described as ‘literary sketches’, were developed to preserve both the diversity and complexity of the cultural settings (Barter & Renold, 1999, p. 2). The vignettes presented in this article, The Little Red Hen and Paper Planes, are based on fieldwork observations and participants’ reflections. They communicate incidents I deemed critical to the research inquiry. In each of the two case studies that follow, I first present the context and teacher’s curriculum and pedagogical approach, and then go on to feature a vignette that illuminates the dialogic intersection of ICT and multiliteracies in the early years. To ensure participant anonymity the names of participants and schools have been replaced with pseudonyms.

**Case Study One: Leah**

With a Master’s degree in education and 20 years’ teaching experience, Leah was recognised by the Western Australian education community as a highly qualified early childhood teacher. She had taught at Merrivale Primary School for 10 years. This state public school was constructed during the 1950s, and was located in a city suburb. The school population was characterised by a rich cultural mix of diverse ethnicity. Twenty percent of the 250 student population (kindergarten to year 7) were Aboriginal and a further 30% had English as their second language. The Western Australian Department of Education and Training had described the school community as disadvantaged with low socioeconomic status.

Leah provided her students with play-based learning activities within the context of a teacher-directed structured early childhood curriculum. During an interview, I asked Leah how her perception of the need for structure influenced her program. She provided the following response:

I describe myself as structured because I like to have a tight sort of idea of what is going to happen ... I adopt a pretty much middle of the road, conservative pre-primary approach with fairly traditional sorts of topics covered and in my expectations of children’s behaviour and their interactions with one another. My program ... lets children know this is what we do and this is how we do it.
Leah valued structure for maximising learning time and accomplishing her academic goals for her students who were working towards Western Australia Department of Education and Training (2005), level one, ‘student outcomes and standards’.

While Leah believed students’ learning activities initiated ‘off the cuff’ were ‘more meaningful’ and more responsive to students’ interests, she preferred not to adopt this teaching approach. She insisted, ‘It has to suit your personality type.’ Leah job-shared with another early childhood teacher, and stated that while she was not as structured as her tandem partner, she felt an obligation to support the curriculum they planned together. Thus, while Leah in many ways followed a teacher-directed approach, her decisions and negotiation of the curriculum were complex and could not be so readily categorised.

**ICT**

Leah defined ICT as technology that ‘can be turned on and off’. Within her classroom, students’ ICT experiences were mostly limited to computer use. The three classroom computers offered the class a free-choice activity that could be accessed with minimal staff assistance (Figure 1). Leah provided time for her students to experiment with computer functions and explore ‘developmentally appropriate’ educational software. Leah noted that she had a positive attitude towards integrating ICT in the curriculum and using it as a communication tool. However, the network connection frequently crashed, and Merri vale Primary School had technology in need of upgrading. Unreliable ICT access was a constant source of frustration.

Since her involvement in the action research project, Leah had purchased a digital camera for classroom use. While she frequently used this camera for documentation purposes I did not observe student use. Leah wanted to purchase a video camera but the school’s limited budget prevented this from being realised. Leah informed me that ICT was one of many resources that the school needed to purchase. They were deemed luxuries that should be handled with great care to avoid breakage and additional cost for repairs. In addition, she had no one to go to for support, as the ICT specialist transferred to another school and was not replaced.

Lack of time was identified as a significant constraint to using ICT. Leah had difficulty finding time to access ICT resources and support, to develop ICT expertise, to integrate ICT in the curriculum, and to ICT problem-solve with interested others. I observed that within the context of Leah’s structured program, time for students’ ICT experimentation to create designs that communicated linguistic and cultural diversity was minimal. ICT was frequently used by students to complete teacher-assigned tasks. The informational aspect of technology dominated learning.
experiences. Leah expressed concern that classroom ICT experiences originated with her, that she initiated ICT ideas, and directed students’ multimodal experiences. However, despite identifying these concerns, navigating alternative integrations of ICT proved difficult given the aforementioned constraints and lack of support.

**Multiliteracies**

Leah believed that early childhood was the time when students needed to acquire foundational literacy skills. She identified oral language as being particularly important, and was worried about her ability to provide a variety of oral language experiences to meet her students’ needs. At the same time, Leah aimed to provide students with understandings of varied communication processes in their immediate environment, noting, ‘In our culture, everything is changing rapidly. So we have to make sure that they’re [students] understanding the whole picture not just the reading and writing part of it.’ Leah believed that multiliteracies learning was best supported by extending existing program activities to include different modes of communications. She acknowledged, however, that these experiences were teacher-directed and ‘did not always connect’ with students’ interests.

Leah’s involvement in the action research project required her to review her literacy teaching, and consider the child as a multiliterate learner. She stated that she enjoyed the collegial atmosphere and networking with other professionals and opportunities to share ideas and strategies with interested others. At Merrivale Primary School, however, Leah did not receive nourishment that supported her efforts to explore multiliteracies: ‘Where do I go from here and what’s the next step that I should take? Because, with my class, I feel like I’m just stuck in a bit of hole ... What do I do now?’

During fieldwork I observed students demonstrating personal preference to select resources and adapt these for personal use during outdoor free play. Students appeared confident when actively designing imaginative games based on their life experiences. These games frequently included references to popular culture and multiliteracies modes of meaning. Gestural and linguistic designs were used to bring superheroes to life. Aural designs communicated a range of sound effects to accompany play scripts. Spatial designs using play props enhanced story meaning. Visual designs were chalked on the pavement. Students initiated, discussed, challenged, and created designs for play purposes then actively modified play scripts to create redesigned scenarios that satisfied players’ intention. This play was often inspired by children’s out-of-school ICT experiences.

**ICT and Multiliteracies: the Little Red Hen vignette**

At the beginning of each school year, Leah planned a language program that focused on the study of traditional stories, nursery rhymes and fairy tales. After each story reading, Leah encouraged students to role-play story events. In response to action research expectations of integrating ICT to promote multiliteracies learning, Leah decided to extend this role-playing activity to include ICT. Her language lesson began with students sitting together to listen to a story, The Little Red Hen. The class then discussed the sequence of events, setting and characters. Leah considered drama re-enactment as a way of involving students in oral language activity:

> We try and get the children to act it out just because that means they are doing some oral language ... they are actually talking and getting up and feeling part of it ... it’s quite hard for children to actually speak ... sometimes we do it with masks.

Leah introduced a second lesson phase. Students were asked to brainstorm story events and Leah recorded their responses in checklist fashion onto a large sheet of paper attached to an easel board. While the majority of students remained seated, some were asked to help the assistant search for listed items to create a 3D model of the Little Red Hen’s farm. Plastic animal figurines, collage materials and natural resources were located. Selected students arranged these items in a large plastic tub (Figure 2), others remained passive observers. Leah described how ICT was used to support the designing process:
We had a little windmill stand and some other things that look liked farm items and then ... the children began to retell the story and move the items around and then one person took a digital photo. I helped them line the camera up a bit. We took some photos then we put the photos on the computer so we could view them. We could see that the white sand was too reflective. You couldn’t actually see the rest of the photo details. So I said to the kids, ‘What are we going to do?’ And they said, ‘Maybe we need some darker sand.’ So we went and got bits of dark dirt and put it into the sand. It involved critical thinking.

Figure 2. The Little Red Hen story setting and text.

Leah confirmed that students were prompted to reflect critically about how they held the digital camera to focus, what angle and figurine position was necessary to capture a satisfactory image that communicated story events. As individual students moved figurines to different farm locations, they ensured that animals were facing one another when speaking. After a series of photographs was taken, the class reviewed digital images as a whole group activity then additional photographs were recorded if the quality was deemed unsatisfactory. Leah advised that students later watched her load images onto a classroom computer. Students were once again asked to recall story details as Leah typed an accompanying text. Her intention was to create a PowerPoint presentation to record this literacy experience.

The Little Red Hen re-enactment integrated ICT. Some students used the digital camera and the teacher modelled computer use to display digital images and typewritten text. Different modes of meaning were explored: visual (props), aural (animal sound effects), gestural (movement of animals), spatial (positioning of animals and background scenery), and linguistic designs (story recall). Leah felt that lesson objectives were achieved: most students could recall the Little Red Hen story, identify its characters, and answer simple comprehension questions on its content. Leah was aware, however, that students’ experiences were compromised to secure expediency of task completion. The PowerPoint presentation of The Little Red Hen was Leah’s idea. She informed me that students lost interest in the ICT learning process, as it became time-consuming and tedious. Leah completed the slide show at home and then presented it at an action research workshop for review. Fieldwork observations confirmed that students used ICT within a controlled and structured learning environment. When ICT experiences were planned, a high degree of teacher modelling was evident. ICT resources were used as teaching tools rather than design mediums that children could use to express cultural and linguistic diversity.
Case Study Two: Whitney

While completing her Bachelor of education with first class honours, Whitney was interested in and studied alternative early childhood pedagogies. After completing her course she taught in the state public system for three years before securing a position at Bridgewater Community School where she had taught for the previous five years. This independent private school was founded in the 1990s and was located in a city suburb with 180 students (kindergarten to year 7) who were predominately white Australian from advantaged socioeconomic backgrounds. Eleven percent of the students had English as a second language. Unlike Leah’s school, no students were identified of Aboriginal descent.

Members of staff at Bridgewater Community School believed they could provide students with quality education by implementing the Reggio Emilia teaching approach. This approach, inspired by Malaguzzi (1986), promotes social constructivist learning principles, ‘the idea that knowledge is socially constructed in a cultural setting’ (Hill et al, 2005, p. 7) and that ‘there is no knowledge independent of the meaning attributed to experience [constructed] by the learner, or community of learners’ (Hein, 1991, p. 1). These principles are integrated in curriculum design, thus, rather than teacher pre-planned, it is ‘negotiated’ through ‘emergent processes between adults and children’ (Pope Edwards, 2002, p. 4). The term ‘the Hundred Languages of Children’, synonymous with the Reggio Emilia approach, denotes how children learn and communicate in a myriad of ‘multileveled and multimodal ways’ using a wide range of resources that include ICT (Spaggiari & Rinaldi, 1996, p. 13). When asked to describe her pedagogy, Whitney used the term ‘social constructivist’ and said that the Reggio Emilia teaching approach provided the best example of its principles in action. She stated that at Bridgewater Community School, the ‘social component’ of social constructivism occurred when students learnt how to form a group, listen carefully, challenge group members’ ideas, and scaffold one another’s learning within a group setting. While ‘multiliteracies’ was not a term used by Bridgewater Community School teachers, the pedagogical approach at the school included visual, aural, gestural, spatial, linguistic and multimodal designs – opportunities for children to create their own meaning and critically reflect of available designs.

Whitney designed a curriculum that involved daily class meetings that provided a forum for children to ask questions to the student group about their project investigations. Projects remained broad-based and open-ended, enabling students to determine study direction. Whitney provided the following insight:

Teachers need time to talk to their co-teacher [assistant] and go to staff meetings and say, ‘What do you think is happening?’ ‘What do you think is going on?’ Teachers need time to reflect and children need time to reflect ... By going and talking with others, you realise that perhaps other strategies or resources can be employed to extend children’s ideas and understandings.

During project investigations Whitney and her assistant modelled social constructivist principles, documented discussions, identified points of student inquiry, and then reflected on how best to scaffold and extend learning interests that may integrate ICT.

ICT

Whitney stated she adopted a ‘broad definition’ of ICT. Whitney and students used a wide range of ICT; projector screen, web camera, multimedia projector, video and digital cameras, photocopier, mobile phones, light table, lamps, shadow screens and overhead projector. Whitney integrated ICT when she or students perceived its potential to support exploration of ideas, for example, as students played with wooden mannequins after listening to the story Fairie-ality (Bird et al, 2002).

Whitney positioned a lamp on a low table to project their silhouettes onto white paper attached to a wall (Figure 3). Students experimented with gestural designs to initiate changes in visual and spatial designs while moving mannequins in front of the lamp. Whitney commented, ‘The lamp gave it depth. They [students] were moving mannequins through the lamp light. They liked the images that it shadowed on the walls.’ During fieldwork I documented many examples of students spontaneously using the digital camera in their project work. This resource was accessed
in the same manner as other classroom resources. A video camera was also available on student request.

Figure 3. ICT used to extend students’ learning interests.

In Whitney’s classroom the use of ICT presented a new learning dimension and provided a medium that could stimulate further designing. Fieldwork confirmed there were two digital cameras that were easily accessible for student use in child-initiated activities. The school budget provided immediate ICT replacement when resources were no longer operational. Since teaching at Bridgewater Community School, Whitney said she had extended her ICT expertise with interested others. She stated that the school was very fortunate to have ‘good’ ICT support and resources. Whitney valued opportunities to learn more of ICT’s functional and creative applications, ‘There is a common bond or commonality between what we are doing and how we can do things’. Collaborative ICT support occurred on an informal daily needs basis, and with the ICT specialist ‘as backup.’

ICT and Multiliteracies: paper planes vignette

During my first visit to Whitney’s classroom, I observed near the entrance door a wooden box overflowing with white paper planes (Figure 4). The box was labelled in child’s hand printing PLANe BoS (Plane Box). Whitney recalled that one student, particularly interested and knowledgeable about planes, started bringing to school toy planes. The child’s grandfather, retired from the Royal Australian Air Force, was restoring an aeroplane. This idea fascinated other children. Soon they brought toy planes to school to integrate in their play.

Later in the term in response to students’ continued interest, Whitney invited them to make paper planes (Figure 5). A high level of collaboration followed as students assisted one another to explore alternative designs. Whitney recollected, ‘So we decorated the planes to make them beautiful ... then we flew the planes just for fun ... We had a flying day but the planes never left!’ This interest continued until the end of the school year. Interest in designing a paper plane book emerged after Whitney read the class a book entitled Tall Towers (author unknown). This reading was in response to students’ interest in block building that accompanied the toy planes. Whitney recalled that it was, ‘a fascination of making and flying planes’ that inspired a small group of boys to design their own book about planes to add to the classroom book collection.

At a class meeting, Tall Towers was re-read by a student and the class reviewed the book layout. Illustrations showed different tower designs and the use of numerous tools to measure buildings’ varying heights. Students discussed the paper plane book presentation. Whitney documented that at the first paper plane project meeting one boy asserted, ‘The book needs words’. Another child added, ‘And pictures to show how much [far] they went.’
During second and third term the children trialled different body gestures to enhance plane speed to gain flight distance. Some students were disappointed with their flight results and asked peers for assistance. A child suggested to project members that they could search the internet for other available designs. Whitney assisted the children to take turns sounding out then typing the letters P-A-P-E-R A-I-R-P-L-A-N-E D-E-S-I-G-N-S into Google search, facilitating alphabetic literacy. Available designs were located at www.paperairplanes.co.uk/planes.html

One class meeting focused on using the digital camera to photograph the ‘best’ plane designs to include in the book. A child observing me video-recording suggested that plane flight could be videotaped so students could see the planes in motion. This proved to be a very popular idea and Whitney promptly located a school video camera. The students took turns to videotape plane flight outdoors and later critiqued the ‘jerky’ recordings. Significant to this investigation was Whitney’s comment during an interview that some students observing but not participating in the paper plane trials later asked to use the video camera to further their own learning interests.

The paper planes vignette illustrates how Whitney’s pedagogy accommodates student interest through emergent curriculum. During the long-term project, students had freedom to integrate toy planes in classroom activities, to design paper planes, and then trial and modify flight processes (visual, aural, gestural, spatial and linguistic designs). They examined available designs using the internet, and designed a ‘fair test’ to determine the most effective redesigned construct. The child-initiated project provided opportunities for students to scaffold knowledge and extend one another’s critical thinking. They sought to design a class reading book (Figure 6), based on an
available design, in their own way – integrating ICT and extending multiliteracies expression. Fieldwork observations confirmed that Bridgewater Community School teachers provided one another with informal ICT support as needs emerged, and challenged one another to expand their ICT expertise. ICT was considered one of the Hundred Languages of Children that can be used by children to express cultural and linguistic diversity.

The Saber-toothed Paper Plane went 18 of Joe's shoes

The Jet Plane went 10 of Daniel’s shoes

The last page of the book presents labeled images of different student shoes used to measure flight distance of each plane.

Our Shoe Size

Discussion

The case studies presented in this article shed light onto two very different contexts, and complicate the notion of implementing multiliteracies pedagogies and infusing ICT in the curriculum. The teacher participants integrated ICT in student learning within the context of different school systems, different school cultures, and different early years classrooms subject to different circumstances. Juxtaposing the two cases highlights the complexities inherent in navigating such instructional approaches: differences in what is understood by a 'multiliteracies approach,' curriculum priorities, support, and level of resources. These varied factors ultimately shape the dialogic intersection of ICT and multiliteracies in the early years.

This study found that while an early childhood teacher may be motivated to integrate ICT in their curriculum for the purpose of enhancing literacy learning, agree in principle with the merits of broadening literacy definition, and attend university-based action research workshops, this is not enough to secure the full integration of ICT to support multiliteracies. That is, to provide students’ with hands-on ICT experiences to design, construct and communicate their individual meanings.
Without quality support and reliable resources, ICT as a potential means of connecting to the varied interests of students in ways that encompass multiple modes, falls by the wayside.

In case 1, the provision of time, space, and resources to support child-initiated open-ended designing processes using ICT was contested by higher assigned priorities. Despite a rich cultural mix of ethnic and linguistic diversity within the student population, a mandated and more structured curriculum impeded potential to tap into the cultural resources children brought to school. In case 2, the school sought to broaden literacy definition in accordance with the Hundred Languages of Children philosophy. The teacher participant’s efforts to facilitate long-term child-initiated project work that explored different modes of meaning to express personal meaning were supported by the school philosophy. Spontaneous experimentation with the constructional aspect of ICT was enabled by quality resources and on-the-spot ICT support. Class meetings also provided regular forums to scaffold multiliteracies learning. Evidenced in budget priorities and weekly staff meetings was a school community committed to enriching and extending, through social constructivist learning principles and the integration of ICT, the Hundred Languages of Children.

Conclusion

The real value of technology is to open up a vast, unprecedented, and up to now unimaginable, range of activities. These both connect with the child’s desire – what children love and like to do – and with the deepest ideas in science, culture, history, project management and entrepreneurial thinking... They are deep ideas of a huge range, and they are the interests of the children. (Papert, 2001, p. 110)

This study has illustrated that time and resources to scaffold multiliteracies using ICT occur within a defined curriculum space. This space has the potential to open up ‘a vast, unprecedented, and up to now unimaginable’ range of activities that can promote literacy learning in the early years. To become active designers of their social futures children require generous provision of uncontented space for informal, spontaneous and child-initiated learning experiences using multimodal designs of meaning to scaffold their emerging interests and express their unique experiences and cultural and linguistic identities. My study suggests that it is equally important to highlight the conditions that teachers need in order to have the flexibility and resources to cultivate this approach.

References
The Dialogic Intersection of ICT, Multiliteracies, and Early Childhood


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