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Supporting educators with the inclusion of technology within literacy classrooms: A framework for "action"

Lisa Kervin
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Abstract: Educators are challenged to consider ways that Information and Communication Technologies (ICT) can be included within classroom contexts. Such challenges often require the adoption of whole school, team or individual focus as technology is examined in connection with the needs of the learners within the school and the pedagogical understandings and beliefs of the educators.

Each researcher has initiated, facilitated and reflected upon school-based projects focused on ways that technology can be incorporated within classroom literacy experiences. In this paper, we describe a "framework for action" that has emerged from our analysis of these. Examples from a range of projects across a number of school sites are examined. Essentially this framework comprises opportunity for enquiry where participants meet to work towards goals as they refine their ability to manipulate technology in connection with their pedagogical understandings as they consider the implication of this for practice. The framework is participatory, collaborative and systematic as communities work together for shared understandings and action.

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Keywords: teacher support, inclusion, technology, literacy, framework, pedagogy, classroom

INTRODUCTION

Connelly and Clandinin (1999) state, "the field of curriculum is – to put it bluntly – a maze" (p. 27). Literacy education is testament to this. There is much literature available where experts indicate their beliefs about how students best learn literacy practices, the most important literacy practices for their success within society, and the possibilities for classroom teachers. Significant paradigm shifts have occurred regarding what constitutes sound literacy practices, exaggerated further as teachers consider the role of computer-based technologies within literacy learning experiences. It is imperative for teachers to find a path through this maze as they make informed decisions about how Information and Communication Technologies (ICT) can be included within classroom contexts.

The current climate of accountability, outcome based education and standardisation in assessment, demand that teachers have deep understanding of pedagogy and how this translates into the experiences and resources that drive classroom practice. Teachers need to ask themselves: what do I believe about literacy? How do I represent this in my classroom? What do my students believe about literacy? How can I incorporate and build upon this within my classroom? What resources do I have to support this? Responding to these questions provides a foundation upon which pedagogy, practice and visions can be articulated and reflected upon.

While there is emphasis on considering ways that technology can be incorporated within the classroom in the literature (e.g., Leu, Mallette, Karcher, & Kara-Soteriou, 2005; Herrington & Kervin, 2007; Dede, 2005), teachers need to be supported as their professional understandings and applications of this to their professional identity and subsequent practice develop. The links between theory and practice are acknowledged as a "creative tension" where the tension lies "…between developing professional teaching standards per se, and 'living these out' in everyday learning environments" (Cumming, 2002, p. 3).

The introduction of school-based projects is identified as one way to challenge practice as new alternatives are considered. It is undisputed that teachers' learning is continuous throughout their professional experience, with professional development and professional growth being interrelated, one unable to occur without the other (Danielson, 1996; Mevarech, 1995). However, to reconceptualise practice with the vision to transform it, it is critical that change is grounded not only within theoretical understandings but also classroom practice (Larson & Marsh, 2005). Teachers need opportunities to see if something works through a carefully planned process of action and reflection.

Hargreaves and Fullan (1992) argue that professional development "…involves more than changing teachers' behavior … it also involves changing the person the teacher is" (p. 7). Fundamental to this is the understanding that professional development must impact upon 'teaching behavior' but also the teacher's beliefs about how this impacts upon student learning. Pedagogical "quick fixes", "off the shelf modules" and "professional development packages" don't work as issues of pedagogical ownership and school context are abandoned (Larson & Marsh, 2005, p. 98).

Embedding a project within the specific school context is acknowledged as a powerful approach (Beaudin & Grigg, 2001). Identifying and responding to the specific contexts in which teachers and students work provides understanding of how literacy is shaped as 'literacy events' (Heath, 1983) and 'literacy practices' (Street, 1995) are carefully considered.

While our knowledge of schools and anecdotal evidence tells us that there are many school-based projects focused on technology and literacy, few are reported within the literature. Some examples we have located include:

- Reid's (2006) experiences of developing a whole school approach to information literacy,
- Maugle's (2006) description of the challenges for teacher-librarians in integrating ICT, and
- Jeffrey, O'Bryan and Phelp's (2007) description of learning experiences focused around virtual stories.

Each of these examples identifies the importance of having a carefully defined project with opportunities for collaboration, sharing and ongoing learning.

METHODOLOGY

Projects conducted between 2006 and 2007 have been analyzed and reported on in this paper. Four specific projects are reported; these are summarized in Table 1.

Table 1: School-based projects

	Project focus	Context	Participants	Project timeframe
Project 1	Incorporating a bank of 15 laptops in literacy experiences K-6	One stream school in regional New South Wales	7 classroom teachers, a literacy support teacher and the Principal	1 academic school year
Project 2	Teacher Professional Development to incorporate Digital Literacy in literacy experiences 3-6	Two stream school in a small coastal community in metropolitan New South Wales	10 classroom teachers, Literacy Coordinator and academic partner	1 academic school year
Project 3	Incorporating video iPods within Talking and Listening experiences within a Grade 4 classroom	Two stream school in a multicultural suburb in metropolitan New South Wales	1 classroom teacher, 24 Grade 4 students and academic partner	3 x 10 week terms
Project 4	Using the slow animation strategy to support the articulation of metacognitive processes	Two stream school in regional New South Wales	1 classroom teacher, focus group of 8 Grade 4 students	5 weeks

Each project presents example of ways that technology can be incorporated within classroom literacy experiences. Data were collected through interview, photographs, observation and analysis of artefacts throughout each project with ongoing analysis. Data were analyzed through coding of transcripts from interviews, field notes and recordings and emerging themes identified. The analysis enabled the researchers to respond to the question:

- How can school-based projects support the inclusion of technology in classroom literacy experiences?

PROJECT 1: Professional development supports the use of laptops to enrich literacy learning K-6.

Table 2: Overview of project 1

Literacy focus:	*Supporting students to:* Locate and examine information from a range of sources Author texts using new genre emerging from computer technology
Technology focus:	*Supporting students to:* Conduct internet and intranet searches Save and retrieve files on a shared folder Communicate between and among students and teachers Use technology to create new texts
School context:	*The focus school is one stream in regional NSW, with access to:* 15 iBook computers with airport connection to the Internet and intranet 4 data projectors (one for each Stage: Kinder, Yr1&2, Yr 3&4, Yr5&6)
Participants:	7 classroom teachers, a literacy support teacher and the Principal

Description of the project

This project investigated teacher use of laptop computers within classroom literacy learning. The need for the investigation was identified by staff at the school as a consequence of the purchase of 15 iBook computers for the school by the Parent committee. An action learning approach was adopted to facilitate reflection on practice and goal setting to address identified areas of need. Professional development with experts from within this learning community as well as with an invited expert from outside the school allowed the teachers to explore their existing pedagogy and the ways that computer technology may support students to achieve deep understandings.

The students were reported to have increasingly easy access to computer technologies at home, exposing them to the escalating volume of New Literacies emerging from the Internet. The teachers recognised their pedagogical responsibility to provide learning experiences that would develop their students' ability to critique and to construct such texts with a strong understanding of the ways authors write for a range of purposes. The staff identified a need for students to access computer technology as required to support learning. Installed in each classroom were 2 or 3 desktop Apple computers, configured into learning stations where students could gather in small groups to undertake tasks. The purchase of more desktop computers was considered impractical and unsuitable due to restricted space in classrooms. Further, the staff rejected the suggestion of a computer lab, as this was seen as isolating rather than integrating technology into daily literacy learning, risking the students adopting a notion that they were 'doing computers'.

Project implementation

The teachers were each assigned a laptop for the year to use as their own. It was expected they would learn about the computer as they designed and planned their programs, sent and received emails, accessed and explored the intranet site and navigated the Internet to identify material to support student learning.

Following this exploratory period, a whole staff focus became the use of laptop computers in the classroom learning and teaching experiences. Table 3 describes the teachers' journey throughout the project and the ways that reflection informed their practice and developed their understanding of the role of computer technology in supporting literacy learning.

Table 3: Implementation of Project 1

Professional development focus	Description
Immersion, modelling and demonstration of laptops in the classroom	Laptop loans were timetabled so that all 15 laptops were assigned equally to different classes across the week. A teacher at the school was appointed technology coordinator, responsible for computer maintenance. The librarian conducted demonstration lessons in classrooms and facilitated skill development for task design on the intranet during staff meetings
Reflection on the use of laptops to support literacy learning	Teachers described their initial 'computer lessons' as teacher input/student response, with the teacher 'on the run', identifying teaching points in response to observations. This approach left the students initially passive as their laptop lids were to remain closed until they were directed to open them and begin the tasks set by the teacher. Tasks involved locating WebPages downloaded to the intranet site, reading them and constructing text in Word or PowerPoint (or in exercise books). The teachers questioned their effectiveness in using technology to support literacy learning. They expressed anxiety about maintaining 'control' over the lesson and adhering to the literacy focus because they were consistently called on to remedy technical difficulties, leaving other students waiting; the technology *was* the learning, rather than supporting it and the teachers reported losing valuable literacy learning time.
Setting goals to support staff reflections	*A timetable change:* The laptop bank was broken into groups of 5 and teachers identified suitable times for use. *Identification of needs:* Teachers grouped themselves according to their perceived ability and confidence with technology for further professional development. *An outside expert:* The Principal engaged a technology education officer who worked with the self selected ability groups and with the full (mixed ability) staff as appropriate for the professional development focus.. *A teacher mentor:* The literacy support teacher worked with classroom teachers, team teaching with guided groups to a particular literacy/technology focus.
Teaching and professional dialogue to support pedagogically appropriate uses of laptops in literacy learning	*Working with small groups:* The teachers focused systematically on smaller groups of students and the ways the technology supported their literacy learning (meanwhile, the other students worked on independent learning tasks within the literacy block). *Working within known frameworks:* They identified episodes where they could capitalise on the affordances of the laptops. Through the existing and well known cycle of whole class, guided and independent episodes the teachers reported being able to keep literacy at the fore of the learning, supported by the technology. The teachers in this project reported using the computers in ways that allowed them to more deeply meet their syllabus responsibilities by providing opportunities for students to critique and create New Literacies. *Observation and assessment informed practice:* Close observation allowed the teacher to make informed judgements about the students with both literacy and technology, allowing for better planning for independent and collaborative work.

Project reflections

The teachers in this project utilised their own understandings of good pedagogical practice in adopting a professional development model using a combination of ability and mixed ability groupings according to the demands of the task, accessing experts, reflecting on growth, engaging in professional dialogue and making recommendations. Their learning community was supportive as they explored this challenge to their existing pedagogies. Working with experts while matching their own abilities with those of similar need allowed the teachers to explore the affordances laptops provide in support of literacy learning within a socially supported group.

At the culmination of the project, one teacher reflected that the teachers at this school now use computers in ways better than ever before, because their critical appraisal of a learning experience leads them to decide whether the computer will enrich the task or simply replace a perfectly suitable pencil and paper.

PROJECT TITLE: Incorporating Digital Literacy in classroom Literacy experiences (Grades 3-6)

Table 4: Overview of Project 2

Literacy focus:	Supporting teachers to: • Increase their awareness of Digital Literacy • Understand the genres of digital texts • Consider ways Digital Literacy can be incorporated within classroom literacy experiences
Technology focus:	Supporting teachers to: • Access digital texts within their classroom
School context:	The focus school is a two stream school located in a small coastal community on the south coast of New South Wales. The school is in a mid to high socio-economic area and had an enrolment of 380 students throughout the duration of the project. The school has access to: • A bank 20 laptop computers • Airport connection to the Internet and Intranet • 2 data projectors • Digital still and video cameras
Participants:	10 classroom teachers, Literacy coordinator and academic partner

Description of the project

The Literacy coordinator had been employed at the school for a period of 12 years and held a leadership position. The teacher was in the unique position of having awareness of previous directions the school had moved in, having established professional relationships with many of the staff, and knowledge of the priority areas within the school. The ten teachers ranged in age from 23 to 53 years of age. More than half of the teachers had been at the project school for more than 5 years. The academic partner had previous experience establishing and maintaining school-based professional learning experiences.

Within the school the need for focus on critical engagement with digital texts had been identified by the leadership team and the classroom teachers. The need to incorporate higher order thinking and problem solving opportunities using texts that interested and motivated the students was the central rationale for the project. To do this, the teachers identified that they needed to develop a repertoire of teaching experiences to facilitate the teaching of Digital Literacy. Engaging in an ongoing professional development experience was identified as an opportunity to embrace change and take risks by incorporating more contemporary texts and reading behaviors into classroom practice.

Project implementation

The project aimed to present professional development experiences focused on Digital Literacy to the cohort of ten teachers. The project was conducted over the course of a year, where the teachers, Literacy coordinator and academic partner met formally for a half-day workshop twice each term. These workshops were planned by the academic partner and Literacy coordinator and facilitated by the academic partner. Workshops were shaped from observations, feedback and articulation of shared goals. Each workshop had a predictable sequence as the teachers examined Digital Literacy and how it could be represented in the classroom. The structure of the workshops included:

- Engagement with a professional reading,
- Sharing of pre-session tasks,
- Focused input,
- Practical workshop experience,
- Goal setting and
- Pre-session task (Kervin, 2007).

Workshops were designed to encourage critical reflection of practice, consider use of technologies within the classroom and plan for appropriate experiences using digital texts. A number of key learning experiences emerged during this time, some of which are described in Table 5.

Table 5: Implementation of Project 2

Learning Experience	Description
Selection of digital text for critical literacy	The teachers spent time examining a range of web-based texts (websites). The teachers examined these in terms of reading strategies and processes needed for the reader to make meaning from the site. Teachers were supported in identifying and critiquing possible sites that may connect with the learning needs evident in their classrooms.
Digital Literacy – critically reading digital texts	Research that has focused on the types of reading behaviours observed from students engaging with web-based texts were examined (e.g., Sutherland-Smith, 2002; Coiro, 2003). These were then compared and contrasted with curriculum outcomes. Teachers observed students interact with web-based texts in experiences facilitated by the academic partner.
Authentic incorporation of technology within literacy experiences	Teachers examined the framework for authentic learning tasks (REF) and considered how this could guide their inclusion of computer-based technologies within the classroom. Work samples were shared and critiques, plans for future experiences were developed and collaborations were strengthened.

Project reflections

The project concluded that embedding the professional learning experiences within the context of the school, using the technology within the school, created powerful learning experiences for the teachers. The project was a 'partnership' between the school and the teachers with experiences being responsive to individual needs, while still meeting the requirements of school policy and expectations, system expectations and syllabus documents. Using the technology within the school meant that teachers were supported in the context that was most relevant for them – the skills and understandings they developed were feasible for their immediate professional context. Further, working as a team meant that specific support was available from each other external to the formal workshops.

The teachers made decisions about how to use the technology to encapsulate digital texts and associated literate practices within their classrooms. At the forefront of the teachers' minds was how the learning opportunities connected with and supported Digital Literacy through the analysis, creation and reflection on an array of web-based texts.

PROJECT: Podcasting to support Talking and Listening experiences for Grade 4 students

Table 6: Overview of project 3

Literacy focus:	Supporting children to: • Analyse and create oral text
Technology focus:	Supporting children to: • Use iPods and podcasting technologies to access and create oral text
School context:	The school is located in metropolitan New South Wales, south of Sydney. The school has an enrolment of approximately 370 students. There are 19 teachers on staff. The school has access to: • A bank 20 laptop computers • Airport connection to the Internet and Intranet • 3 data projectors • Digital still and video cameras • 19 30GB 5th Generation Video iPods
Participants:	1 classroom teacher, 24 Grade 4 students and academic partner

Description of the project

The project was funded by an Apple University Development Fund (AUDF) grant from The Apple University Consortium (Reid & Kervin, 2006). Funding provided 19x30GB 5th Generation Video iPods and 10 microphone attachments to be used by the teacher and Grade 4 students. A bank of laptops was also available with software to enable the editing of oral text. The iPods were used and incorporated within teaching and learning experiences in ways that were responsive and connected to curriculum outcomes within the Talking and Listening strand in the English curriculum (Board of Studies, 1998).

The class teacher has more than ten years teaching experience across Kindergarten to Grade 6 in schools. During the project the teacher held a leadership position within the school, with 'technology' being an area of responsibility. This role saw the teacher responsible for the purchasing and maintenance of equipment, supporting the professional learning experiences for teachers and trouble shooting problems as they arose within the school. Further, the principal had a vision that the teacher's classroom should provide an exemplar model of technology integration.

The teacher identified the need to examine the teaching of Talking and Listening within the Grade 4 classroom. Such focus was pertinent to these students and the whole school community. Classroom programs and anecdotal evidence indicated that opportunities for students to engage with, explore and examine the Talking and Listening strand were limited in comparison to the Reading and Writing strands. It was the intention of the project to examine how technology integration could foster and support Talking and Listening within the classroom environment.

Project implementation

To begin the project, the Grade 4 students were interviewed to ascertain their previous experiences with, and understandings of 'talking' and 'listening'. Overwhelmingly, their responses revealed the teacher did the 'talking', while 'listening' was what the students did.

Initial interactions with the equipment were focused on familiarizing the students with the technology. Time was allocated for the students to explore the capabilities of the iPods after explicit modeled sessions led by the teacher. During these experiences the students demonstrated their ability to quickly learn processes to manipulate the iPods. Throughout the duration of the project the students did need regular input and demonstration to enable them to manipulate the technology (iPods and associated peripherals) easily and confidently for the purposes of their literacy learning.

From the period of May to November the Grade 4 students engaged with a range of tasks that incorporated the iPods and podcasting technologies within their classroom literacy learning experiences. These tasks were designed to complement existing classroom processes, themes and curriculum outcomes. A number of key learning

experiences emerged during this time, some of which are described in Table 7. It is not proposed that these occurred in a linear order, rather, the students engaged in multiple interactions of these as they examined the learning about oral language that emerged from their use of technology.

Table 7: Implementation of project 3

Learning Experience	Description
Creation of radio shows	The students engaged with an introductory unit of work focused on connecting radio shows to the Talking and Listening strand of the English K-6 syllabus (Board of Studies, 1998) The students: • Investigated and deconstructed oral texts • Explored the parts of a radio show • Created segments for a radio show • Developed class radio show • Evaluated their radio show
Listening to audio books and podcasts from other sites	Audio stories were accessed and downloaded to individual iPods for students to engage with during 'reading' opportunities in the classroom. These acted as examples of 'exemplary' oral reading, as they provided clear models for the students through the demonstration of high levels of phrasing and fluency in the oral text. Opportunities to listen to these texts enabled the students to identify characteristics of engaging oral texts that supported their subsequent evaluation and critique of their own oral texts. Specific podcasts were also connected with areas of classroom study. As example, when constructing information reports on animals, the students accessed podcasts from Minnesota Zoo and San Diego Zoo to support their gathering of information.
Student creation of podcasts	The initial focus on deconstruction, reconstruction and interaction with audio texts appeared to equip the students with a range of skills and strategies. Students worked in teams to create podcasts on a variety of topics. Prior to the recording of any podcast, the students engaged in significant research, planning and articulation of purpose. The teacher developed clear proformas to guide this process and engage the students in critical thinking about the purpose of the podcast and intended audience.
Development of a class website	To support the facilitation of information and sharing of student artifacts, a class website was developed. This virtual space enabled students to easily access podcasts they needed for classroom experiences while also providing a forum where work samples could be posted and shared among the class members. The website was became a way to further extend the seamless integration of the iPod and podcasting technologies within the classroom to support student learning. Further, the site provided students with a clear sense of audience for their created texts.

Project reflections

Planning for, and facilitating these experiences, required the teacher to reconceptualize classroom practice and the notion of literacy learning. The teacher made decisions about how to use the technology to make meaningful and purposeful connections to the English curriculum. At the forefront of the teacher's mind was how the learning opportunities connected with and supported oral language through the analysis, creation and reflection on an array of podcasts.

The careful marrying of the technology with the curriculum meant that learning experiences were appropriate for the students. The curriculum outcomes remained at the forefront which then resulted in technology being used in ways that were responsive to these, rather than leading and directing the experiences.

PROJECT: Using the slow animation strategy to support the articulation of metacognitive processes

Table 8: Overview of project 4

Literacy focus:	Supporting children to: • Articulate their metacognitive strategies and processes during learning experiences
Technology focus:	Supporting children to: • Use animation technology to help make connections between literacy and numeracy
School context:	The school is located in regional New South Wales, south of Sydney. The school has an enrolment of approximately 382 students. There are 16 teachers on staff. The school has access to: • A bank 20 laptop computers • Airport connection to the Internet and Intranet • 1 data projector • Digital still and video cameras
Participants:	1 classroom teacher, focus group of 8 Grade 4 students

Description of the project

The project was developed by the teacher as a research project to contribute to tertiary studies. The concept of slow animation was taken from a broader research project at the university.

Drawing upon assessment data, the teacher identified a focus group of eight students that needed additional support with their articulation of metacognitive strategies and processes. A unit of work was developed to integrate the use of slow animation as a teaching strategy to assist students to document, describe and reflect upon their understandings within mathematics experiences. As an integrated literacy / numeracy experience, opportunities to engage with concrete materials, manipulate these, and describe understandings were planned for. The students were organized into groups of 4, each with two girls and two boys and mixed interests. Each group was assigned to make multiple representations of a numeracy concept (for example, representations of fractions).

The teacher worked with the students as a group during regular classroom teaching time. The activity was one of four group based experiences during the classroom numeracy block. All students within the class were involved in a group task. It was the teacher's aim to have the students incorporated within the slow animation group 'teach' other students how to do this at the end of the five week unit.

Project implementation

Over a 5-week period the Grade 4 students engaged with experiences focused on the creation of a slow animation. These experiences were designed to complement existing classroom processes, themes and curriculum outcomes, while at the same time equipping students with technological expertise that they could then share with other classmates. A number of key learning experiences emerged during this time, some of which are described in Table 9.

Project reflections

This project found that slow animation enhanced student understanding. The students' demonstrated increased competency with articulation of strategies and processes with mathematical concepts throughout the experience. The technology was observed to engage the students through the time spent on task, discussions between and among the students and individual student reflections. Further, the technology proved to be a mechanism to integrate numeracy and literacy practices within the classroom context. The opportunity for the students to assume the role of 'expert' with this technology for other students and teachers appeared to empower and motivate them further.

A Framework for "action"

Within these projects, the overarching philosophy that the classroom teacher is an 'expert' in pedagogical practice is reflected through the frameworks within which the

Table 9: Implementation of project 4

Learning Experience	Description
Modelling the slow animation process	The teacher constructed examples of slow animation. These were deconstructed with the students to model the process and introduce the technology to the students. A range of animations were available at this time, each demonstrating different mathematical concepts and understandings.
Creating a slow animation	Each group identified a mathematical concept they needed to investigate further. Through the process of storyboarding the students began to consider how they would organize an animation sequence using concrete materials that they could annotate to demonstrate their understandings. Opportunities to talk through plans with the teacher were scheduled. Students then photographed a sequence of images using concrete materials. The students did this using a digital camera and a tripod
Making connections	Slow animations were presented to the class using the digital projector. As the animation was displayed, the students explained what was happening in the image sequence. Other teachers were invited to hear from the students as way of disseminating the slow animation teaching strategy amongst staff. Using the slow animation the students individually made connections between this and other class work to explicate their numeracy learning. The process of creating the slow animation was also recorded and this was shared with another cohort of students to share the technological knowledge and expertise.

professional development occurred. That the technology was novel to the participant teachers did not diminish their ability to share their understanding of 'good' teaching, nor did it position these teachers as deficit in their ability to design and facilitate literacy learning experiences supported by these 'new' technologies. Facilitators working within the projects were guided by the understanding that classroom teachers are experiencing a paradigm shift that recognizes a broadened definition of literacy and what constitutes literate practices. These projects, too, take into account external pressures impacting teaching decisions, such as mandated curriculum outcomes.

Figure 1 depicts a framework for action as teachers engage in professional development for the inclusion of technology in literacy learning experiences. Following Figure 1, each of the elements is explicated.

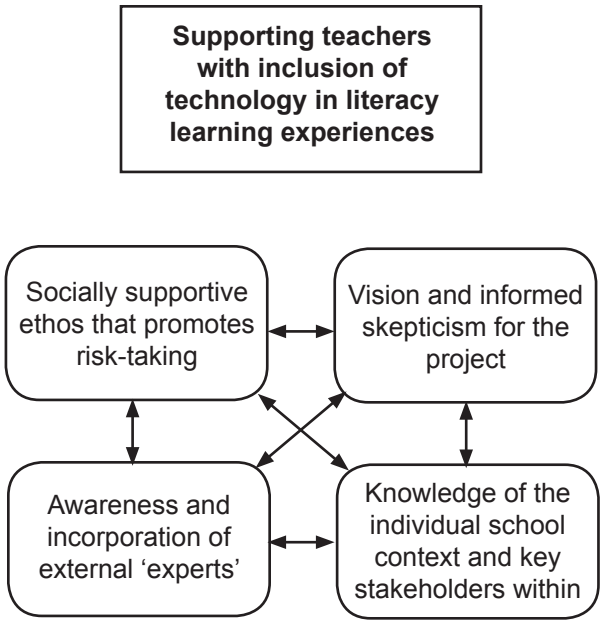

Figure 1: A Framework for Action

Socially supportive ethos that promotes risk-taking

Professional development was a central feature of each project. Projects 1, 2, and 3 provided clear example of professional development within the context of the school for an identified need. The teacher in project 4 provided example of how the theory of university study could be incorporated within school-based projects. Teachers from each project participated in an environment that drew on existing collegial relationships and support systems. There was a feeling of acceptance and openness for each project. The community was further enriched for socially supported learning as the teachers identified the shared goal of including technology in their literacy teaching. Evans and Nicholson (2003) identify development of a common language and identity, the sharing of goals and experiences applying theory to practice as essential to building community. The development of each of these elements provides opportunity for facilitators of school based projects to meet the particular needs of the learners within each context.

Awareness and incorporation of external 'experts'

In the first project, through reflection on the process, the teachers identified the need for breaking into smaller, ability based groups in order to work with an 'expert' from outside their school community. In Projects 2 and 3, the external expert, an academic partner, carefully supported the in-school project leader in developing professional development experiences to meet the needs identified by the teachers as they applied their developing theoretical understandings to classroom teaching. The fourth project provided example of how engaging in external study could provide scope to bring 'expertise' into the school community. Key to this external expertise, however, was the opportunity the teachers took at other times throughout the projects to share their own expertise with their colleagues in order to develop the shared knowledge within the group. For example, in project 1, the teachers met in Stage based groups and worked together designing learning experiences for their students. In project 2, the opportunity for sharing was consistently embedded within the workshops.

Through reflection and critical analysis of the process, teachers participating in school based projects can identify their specific needs and locate appropriate help within or beyond the community as appropriate.

Vision and informed skepticism for the project

Each project provides example of how technology can be connected to needs within individual schools. Incorporating staff professional development, practical classroom application to support student learning and clear connections to curriculum expectations enables technology to be used in pedagogically responsive ways.

Not all technology is good technology. A school based project that supports teachers to adopt pedagogically appropriate uses of technology in their literacy teaching promotes critical appraisal of new technologies and their potential in the classroom. There is an identified obligation for schools to respond more comprehensively to the needs of modern learners; for them to adjust existing pedagogies in line with the out of school literate practices of young people (Williams, 2005). The projects reported in this paper question the use of technology for its own sake in favor of investigating the literacy gains in facilitating the experiences for the learners.

Knowledge of the individual school context and key stakeholders within

Supporting Larson and Marsh's (2005) argument that teachers need opportunities to bring theory and practice together in the classroom, this model identifies professional development as most effective when it occurs within the context of the teachers' school settings. It is through such on site collaboration that suitable steps may be taken to support each teacher as they explore the use of technology to support literacy learning. This support may take the general form of a staff meeting, as in Projects 1 and 2, or a more personalized perspective involving in-class visits and small group meetings, as in Projects 1 and 3.

FINAL REFLECTIONS

Leu (2000) argues that in meeting the needs of learners today, technology use is essential in classroom literacy learning experiences. Further, he challenges researchers to explore the ways teachers can be supported in their efforts to include new technologies in their teaching rather than on mastering applications and software (Leu, 2000). The framework proposed in this paper supports teachers as they explore the ways new technologies and associated pedagogies fit with their existing beliefs and practices about literacy learning. The opportunity for enquiry where participants work towards goals as they refine their ability to manipulate technology in connection with their pedagogical understandings as they consider the implication of this for practice is embedded within each project. Housing projects within the context of the school environment allows teachers to work corroboratively to address the issues and concerns of their students as they apply theoretical understandings to practical settings. Projects that are participatory, collaborative and systematic result in communities working together for shared understandings and action.

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