Computer based learning in a primary school: Differences between the early and later years of primary schooling.

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Abstract: With increasing expectations that all students and teachers are actively involved in computer based learning within a primary school, it is expected that appropriate environments are set up to support the varying needs and potential of the different groups within the school context. However, in case-studies of primary schools done as part of the e.fects project, our research indicated that the environments being established within a school are often inequitable, favouring the later primary year levels over the early school years. This paper will present illustrative evidence from the case-studies and will discuss some observed differences in approaches between the early and later primary program in terms of early childhood philosophies which underpin the K-2 year levels.

Key Words: Early childhood, primary school, equity, ICT, home-school, learning environments, professional development
Young children are now spending substantially increased amounts of time learning using computer-based technologies. This increased use draws attention not only to the learning that is taking place but the environments that are being established to facilitate this learning. Recent years have seen a great deal of attention focused on older children’s learning with computer-based technologies, however more and more research is indicating that not only are children capable users of computer-based technologies but the use of it in the early years has its own unique potential for learning which impacts both on the child’s immediate school learning as well as their learning into adult life.

In the early years of school, working with computer-based technologies enables young children greater opportunity for working with ideas creatively. The very nature of computer-based technologies is that ideas are linked together in terms of associations rather than the linear ideas; as is the case in print-based resources. In the early primary school years’ computer-based technologies have the potential to allow young children to work with and experience ideas that were previously inaccessible, due to their complex and abstract nature (Kilderry, Yelland, Lazaridis & Dragicevic, 2003; Sheridan & Pramling Samuelson, 2003). In addition, working with ideas in this format is also more reflective of a person’s natural thought patterns. For a young child therefore, working with computer-based technologies allows for a more natural approach to thinking and working with ideas with less restriction on adaptations to prescribed linear approaches to thinking.

With increased use of home computer-based technologies (Rideout, Vandewater & Wartella, 2003) young children are entering school with more, well-developed computer skills. Children in the early years of school are often comfortable enough with their own computer skills to be able to focus on the learning content they are working with; rather than the technology (Kilderry et al, 2003). However for children to be able to gain from the learning possibilities they offer, several aspects and conditions also are required to support children in their use including the availability and location of computers greatly influence how they are used and how well they are integrated with other activities (Sheridan & Pramling Samuelson 2003).

If young children are to gain the learning benefits computer-based technologies offer then it is essential that schools establish environments which support children in this learning. An understanding of how this learning is being supported and encouraged is necessary if we are to enable children to gain the potential learning benefits computer-based technologies afford.

This paper examines the types of computer-based learning environments being established for young children in schools and how they impact on a child’s learning. Three case studies have been selected from a number of studies that have been completed as part of an A.R.C. project designed to examine the use of computers in schools. From these case studies three themes are identified and discussed.
The Study

The effects project, on which this paper draws, had two main areas of interest: identifying good practices with computer-based technologies that enhance students’ learning and the factors contributing to this good practice. A second interest was in identifying how different kinds of students relate to uses of computer-based technologies and how different schools develop effective practises and environments for these students.

The effects project was designed to take a qualitative and longitudinal case-study approach of NSW government primary and secondary schools. The study included seven case study schools (which entered the project at different points). It comprised approximately 60 school visits, encompassing classroom observations, interviews with principals and executive staff, focus groups with school parent and student representatives and analysis of relevant policy documents. Methods adopted in the effects study gave a view of what is happening with computer-based technologies in the ordinary life of schools. They enabled a closer look at the ‘learning with computer-based technologies’ culture that was being developed in ‘real’ schools over a three year period and what this meant for teaching and learning at each of those schools.

Comparison of approaches to computer-based technologies across the year levels in the primary schools was not an aspect of difference initially focused on in the study. However, it became clear relatively early on in the field visits that learning with computer-based technologies was being developed more solidly in the later primary years compared with the early school year levels. This paper outlines aspects of the differences, namely in uses of computer-based technologies, home-school relationship and teachers’ expertise.

The Case Studies

Red Hills Primary School

Red Hills Primary School was the first of the seven participating schools to take part in the effects project. The school participated over the entire three year length of the study.

Red Hills Primary School is a K-6 government school located in western Sydney. The area has undergone significant demographic change in recent years. Once dominated by young families in their first home, the area is now increasingly becoming rental accommodation. The school has a number of empty classrooms with school enrolment declining from approximately 600 students five years ago to the present figure of 360 students. The principal describes the community as ‘basically white, Caucasian middle class Australian’. Approximately 8% of students are from non-English speaking
backgrounds, there is a small number of aboriginal students and a small number of Brethren\(^1\) children in the school. There are 17 teaching staff in the school.

A school survey conducted in 2001 indicated that 85% of students had computers at home, although the nature of home use was not ascertained. Teachers also could not elaborate on children’s home use of computers. Only two teachers in the study could identify the students in their class that did not have computer at home. In both cases, the teachers ensured these students had “extra turns” on the computers in class.

Red Hills Primary School underwent a change of principals during the study. In 2002 the principal was seconded to the Department of Education and Training (DET) and the more senior of the two assistant principals became acting principal. The assistant principal position was then filled with a new staff member transferring to the school.

The principal at the onset of the study had held the position for 2 years. Describing himself as a computer enthusiast, the principal viewed technology as a “learning tool” and his focus was to develop skills for using this tool; skills which the school Technology Plan indicates, extends to students, staff and parents. The principal worked towards this vision with the computer-coordinator; the second key ‘technology’ figure in the school. The Principal volunteered to trial the Year 6 Computer Skills Assessment – a standardised computer skills exam implemented by DET, with the current Year 6 students at the school.

The school had a computer lab comprised of 18 computers. Each class visited the computer lab once a fortnight for a lesson taught by the computer co-ordinator. This arrangement served the dual purpose of providing some skills development for the students as well as providing release time for the regular classroom teachers, referred to as “relief from face to face teaching” (RFF). The lessons reflected the Computer Skills Scope and Sequence Plan which had been developed by the computer co-ordinator. This program outlined exit computer competencies for each year level. Work samples exemplifying how exit competencies were built on and developed over the year levels were displayed on the walls in computer lab.

The computer co-ordinator stressed the need for these computer skills lessons to be highly structured. All computer lab lessons observed followed a similar format where one half of the class worked on the skills lesson with the computer co-ordinator, while the other half of the class worked independently on a software program selected by the computer-co-ordinator. For example, half a year 2 was observed sitting on floor ‘watching and learning’ as the computer co-ordinator navigated around the computer to access a student file and half a Year 6 class was observed learning to paste graphics from a clip art CD into a word document. In both cases the second half of each class worked independent of the computer co-ordinator, with drill and practice software such as Maths Circus: Act 1 (1993). While working in the lab, one group of upper primary students

\(^1\) Brethren do not use information technology because of their religious beliefs.
computer-based learning in the primary school

commented that the lessons in the lab were “practising to use computers” and that they would “use them for real work in high school”.

There was an expectation by the principal and computer co-ordinator that students would build on the ‘computer lab skills’ in their regular class work. However, only two classrooms teachers, both from upper primary, appeared to take explicit action to ensure that this occurred. They both stated that they had worked with the computer co-ordinator in this respect. While all teachers were appreciative of the computer-coordinators efforts, the majority of teachers stated they were unaware of what the students actually ‘did’ in the computer lesson. The Kindergarten teacher stated that she was not aware of what her students were doing (in the computer lab), but from what she saw of their use of computers in the classroom, her expectation was that it was not very advanced. Comparatively more teachers in the younger year levels than primary teachers positioned themselves as novices in comparison to the computer co-ordinator’s skill level. While the computer co-ordinator was available to all staff for informal professional development, the two year 1 teachers stated they were happy to leave the bulk of computer use to RFF lessons where they were sure the students would get all the computer skills they would need by the end of year 6.

The school was working towards a school-wide ratio of one computer for every four students. The principal stated that they distributed new and old computers where they saw the need. The computer co-ordinator elaborated stating that the school prioritised the quality and number of computers to older year levels. In practice this meant that all new computers went to the upper primary classrooms and the older computers were reallocated to the younger grades. In the final year of the study, the Year 6 classroom teacher--the new assistant principal--had gathered all the older computers within the school to acquire a total of 7 computers for his classroom.

Cabling of the school to allow for networking of computers in classrooms followed a similar pattern with Stage 3 classrooms (years 5 and 6) being cabled first then working down to Stage 1 (years 1 and 2) and kindergarten classrooms cabled three years later. Older computers within the younger year levels was an issue for cabling with the year 3 teacher stating “I used to have three internet-ed ones (computers), but they took one of mine and gave it to the infants’ class, to get infants on the internet as well”. The Kindergarten teacher interviewed in the final year of the study said that while the school had acquired a lot of new computer resources “not a lot had changed for the age group she teaches”.

Understandably, given the way in which the cabling of computers was approached at the school, use of internet over the three years of the study, was only observed in some upper primary classrooms and the library. The Principal was enthusiastic about upper primary’s use of the internet and was hoping for increased use in the middle primary. No internet use was observed in the younger year levels in the school. Year 1 teachers did not identify any plans to use the internet. The year 2 teacher stated that with the internet now connected she has plans for how it could be used, however with only one computer connected it was too difficult to do; and there was “no time anyway”. The Principal did
not express concern about the lack of internet with the younger students nor expressed plans to encourage it. He stated that he was not really expecting any use anyway.

Classroom observations of computer use in the younger years, indicated heavy reliance on drill and practice software which focused on developing basic literacy and numeracy skills. In general it was reported that students used the computer independently once a week as part of reading groups. Use of drill and practice software was repetitive—often the same software for a term. A number of students commented in a similar vein to a Year 2 student who said that “the teacher never comes because we never need any help, we’ve played this game lots and lots of times.” Assessment of learning was often left to the software; “how students were progressing through the level of the games.” Many teachers were observed using the same software in the same way over the three-year period of the study.

With regard to teachers’ attitudes to computers and their use in primary classrooms, all classroom teachers agreed it was important for children to develop computer skills for future workforce; they were however quite divided in their views of how this fitted into the school context and their teaching. All upper primary and middle primary teachers were enthusiastic about the need for computers in learning, with one teacher stating “particularly from year 4 – it’s the sensible thing to do”. Every teacher in the younger year levels, except one, indicated that they were not convinced that the computer developed student literacy and numeracy skills any more than traditional teaching methods. There was also scepticism among teachers in the younger year levels that over-use of computers interfered with for the need for children to play, social and develop their motor skills. Teachers in the younger year levels were sure however, that students would have all the computer skills they would need by the time they finish year 6.

In conclusion, computer based learning in this school was found to have several features: (a) resourcing policies that placed the best computers and most internet access in upper primary classrooms; (b) the development of computer skills through highly structured, fortnightly computer lessons for all year levels, (c) minimal consideration given to children’s out of school use of computers; (d) some use of the internet in senior primary classes, (e) a reliance and repetitive use on drill and practice software in early primary classes, (f) little use nor expectation of use of internet in early school years (g) the majority of teachers and the principal not convinced of the value of computer-based learning in early childhood education.

**Blane Primary School**

Blane Primary School joined the *effects* project later in the first year of the project. The school participated in the study for two years and six months.

Blane Primary School is a kindergarten – year 6 (K-6) government school located in a satellite city of western Sydney. The school has a mobility rate of about 12% each year and equity issues are significant as many families are recent first home owners or living
in rental accommodation. The principal stated that many families did not have access to computers at work or home. The school has an enrolment of 515 students. Approximately 17% of the school population have limited English proficiency and there is small Brethren student group. The school currently has 18 teaching staff, ranging in experience.

The school was built in 1991 and the principal had held the school leadership position for 6 weeks at the onset of the study. He had been seconded from a previous principal position at a primary school celebrated for its high achievement in the use of technology in education.

The principal’s described his vision for computer based technologies in the school as an “educational vision”. He wanted to improve teaching and learning so that it was more reflective of a constructivist approach. His belief was that progress would be made if teachers are made to feel uncomfortable and required to take on something new. He saw computer based technologies as the catalyst for this change.

One change strategy utilised by the principal was the establishment Stage Teams to work along the lines of ‘learning communities’. The underlying principle of these teams was that they would act as a means of support and growth for teachers and students as they developed expertise in using computer based technologies to enhance student learning. At the final visit to the school, three years later, it was noted that only the year 5 and 6 teachers had taken action to adopt a more cooperative ‘learning communities’ environment within the classroom. They both stated that they had worked on the development of this within their classroom.

All classrooms at Blane Primary School had two or three computers and all classes were cabled for internet access. In 2002, the school acquired 10 new laptops and these were housed in the library. Old library computers were distributed through the school but the principal was not involved in the distribution and was unsure of where they “ended up”. Classroom observations however indicated that the better quality computers were placed in the primary section of the school.

Specific software was introduced to be used with classroom computers across all year levels. The software included Kid Pix Studio Deluxe (2000), Inspiration (2002) and iMovie (1999). Professional development centred on the use of this software. Midway through the study, year 5 and year 6 teachers discussed the lack of value of using software such as iMovie (1999) in light of the external pressure created with the introduction of the Computer Skills Assessment by the Department of Education and Training (DET) for “other” specific computer skills. In the final year of the study the year 6 teachers happily reported a shift in the way computer based technologies was used with students. The “new” focus was for students to spend time learning the aspects of the test students in the previous year did not perform well in, such as uses of spreadsheets. In the final year of the study the technology goals stated in the School Annual Report indicated that students in Stage 2 (years 3 and 4) and Stage 3 (years 5 and 6) would
produce at least one multimedia product linked to class work. There were no “technology” goals stated for Early Stage 1 (Kindergarten) or Stage 1 (years 1 and 2).

Students’ computer skills were also developed in the context of the library. While the library was not referred to as a computer lab, the librarian, who was also the computer co-ordinator, conducted whole class computer lessons for all year levels using the library computers. The librarian expressed concern that all children do is play games on their home computer- and that it was important for them to know it is an educational tool. When describing a ‘typical’ Kindergarten lesson, the librarian stressed that it was familiarisation with computers that the young students needed. She elaborated on how she approached this by illustrating a typical teaching scenario with Kindergarten, ”Put your hand on the monitor, put your hand on the keyboard, touch the mouse…”. She stated, “I haven’t jumped straight into a program because unless they know they’re touching a mouse there’s not much point!” Library computers were also available for lunchtime use by all students; some weeks however were deemed year 6 use only.

Uses of computers observed in primary classes included both independent and collaborative internet searching and information gathering and word processing. Only one class from the younger year levels was allocated to us to take part in the study. Over the three-year period of the study the Kindergarten teacher--a recent early childhood graduate specialising in IT--reported making one movie using iMovie (1999) and Kid Pix Studio Deluxe (2001) with her class and working with Inspiration (2002) on one occasion with her class. Outcomes from both lessons were included in University assignments. The teacher expressed concern that children just use X-Box and PlayStation at home and possibly some maths games and they did not see the computer as an educational tool. During the course of the study the same lesson, which was a reading groups activity, was observed in the Kindergarten classroom. In this lesson, students used Kid Pix Studio Deluxe (2001) for a phonics based lesson in which a letter of the alphabet was written on a sheet of paper and students were required to search for pictures with the matching initial sound. The students stamped the matching pictures on the screen then drew or wrote the same picture on their worksheet. If a matching stamp could not be found, students used the pencil tool to draw their own pictures on the screen. At the completion of the worksheet, student accessed (on the same software) a recording of the alphabet song (made by the class) and listened to the verse about the letter they had been working with. The teacher stated that she felt supported by the principal and the computer was used regularly by students in her classroom. She stated however that in general not much consideration was given to young children’s use of computers. One example of this she stated was the lack of availability of internet sites suitable for young children.

In conclusion, computer based learning in this school was a found to have several features: (a) resourcing policies that were haphazard resulting in uneven distribution of resources favouring the upper primary years, (b) limited range of uses of computer-based technologies across the year levels; (c) repetitive use of computer-based technologies in the early year levels (d) little understanding and attention to building on students’ home use of computers, and (f) friction between approaches to computer based learning
Computer-based learning in the primary school

undertaken by the principal, teachers’ role and system expectations of computer use within a primary school.

**Gason Primary School**

Gason Primary School joined the effects study late in the second year of the project. The school participated in the study over a one year period.

Gason is located in a rural community in NSW approximately 250km from Sydney. It is a well-established locality and maintains a stable although aging population. Gason Primary school is a K-6 primary school with an enrolment of 389 students. There is a small percentage of aboriginal students within the school as well as a growing number of Brethren students. The principal described the school as ‘very, very, non-multicultural.” The school has an experienced teaching staff, with 18 classroom teachers. The present principal was appointed in 2001. He was an experienced principal having led schools within the state as well as two international postings.

In the initial visit to the school, the principal stated that his vision was to see teachers and students working with computer based technologies across all Key Learning Areas. Part of this vision was to see staff developing computer based technologies skills alongside students in ‘learning communities’. The Principal and stage 3 teachers (year 5 and year 6) were the identified as the ‘computer experts’ in the school and were the school computer based technology decision makers. The librarian also provided technical support for library and classroom computers as well as supporting teachers in the use of computer-based technologies use. This was role was not acknowledged in terms of salary nor time and was undertaken over and above her 4 day a week, librarian role.

The library housed 8 computers and was used as a computer lab. Each year level came to the library for computer skills lessons taught by the librarian. In regards to classroom computers, the principal stated in the first visit to the school, that he was working towards a ‘school-wide’ target of 4 computers for every classroom. In the final visit to the school the principal declared this target had been “reached”; Stage 3 (year 5 and year 6) had 4 computers and Stage 2 (year 3 and year 4) will have reached this target with the next Department of Education (DET) computer roll-out. The principal then stated that he planned to start working on this target with Stage 1 (year 1 and year 2) and Early Stage 1 (Kindergarten). Interestingly, later, in the same conversation the Principal discussed student access to computers as equal across all year levels.

In addition to quantity, quality of classroom computers varied across the year levels. The year 1/2 teacher stated that “Kindergarten, year 1 and year 2 had been given the oldest computers that the year 5 and 6 refused to have any more.”

With the exception of the Year 5 and 6 teachers, the principal labelled staff expertise with computer based technologies as the ‘lowest common denominator…with the majority unable to turn on a computer a little while ago”. All staff had completed TILT a basic computer skills workshop run by Department of Education and Training. As a further strategy to develop staff computer based technologies expertise, the principal initiated
digital portfolios into the school. As part of this professional development, 4 high school
students visited the school weekly to support staff by taking digital photos and setting up
student folders. In 2002 Stage 3 (year 3 and year 4) were using digital portfolios and in
2003 stage 2 (year 3 and year 4). The principal stated Stage 1 (year 1 and year 2) was the
next focus; there was no mention of Early Stage 1 (Kindergarten).

The most recent initiative for staff professional development had been the opportunity to
participate in a series of workshops run by the computer company Intel. The workshops
were highly recommended by other schools and required teachers to take part in a series
of after school workshops. The workshops centred on a “Train the Trainer” model,
where those who participated in the workshops then passed on their newly acquired
expertise to teachers at school. While the workshops were open to all teachers, only
teachers from Stage 3 (year 5 and year 6) and Stage 2 (year 3 and year 4) participated.
The teacher nominated as the school liaison person for these workshops stated “…the
infants teachers just didn’t want to be involved”.

While the two teachers from the younger year levels participating in the study expressed
positive views about the efforts of the principal in regard to computer based learning,
they questioned the value of computers for learning. One teacher stated she was “a bit
iffy” about using computers with little kids.” In an interview with the principal
discussing teachers’ enthusiasm and commitment to computer based learning the
principal stated was happy with what was happening in Stage 3 (year 5 and year 6), but
was concerned that Stage 2 (year 3and year 4) were not as engaged in using the
computers for student learning as he would like. The principal asked if the research team
could discreetly have a word to these teachers regarding this. The conversation continued
with the principal describing the Stage 1 (year 1 and year 2) teachers as ‘dabbling’ with
the computers in the classroom, but he was not concerned with this. He made no mention
of Early Stage 1(Kindergarten).

The Stage 1 (year 1 and year 2) teacher reported that she did not like students playing
games on the computer. As a means of addressing this concern, she primarily used the
computer herself to create worksheets, which she then printed off and photocopied for the
students. Only those students in the most advanced reading group were given the
opportunity to use the internet during class. For this group of students the teacher gave
the students the web address which they would key in themselves, they then had a
question which they were required to find the answer to and when the answer had been
located from the website, the students would write it in on their worksheet. The teacher
shared that she saw some really exciting ways of using the internet, Power point and
digital photos in the Stage 3 (year 5 and year 6) classroom but she was unsure of “how to
get it to a level where the littlies could actually start using it”. She also stated that she
would like to use the digital camera with her class, however they were difficult to access
as they were housed in the Stage 3 (year 5 and year 6) classroom.

In conclusion, computer based learning in this school was a characterised by: (a)
resourcing policies that favoured the upper year levels in terms of quality and quantity of
computers and peripherals; (b) lack of teacher expertise on effective integration of
computer based learning in the early school years; (c) lack of principal commitment and expectation for computer based learning in the early primary years; (d) no evidence of building on children’s home use of computers; (e) decision making for computer based technologies in the school over-represented by teachers in upper primary; (f) Early years teachers negative views on the appropriateness of computer based learning in the early school years.

Discussion

The three case studies illuminate some of the approaches and environments for computer-based learning that have being established in primary schools. They indicate a number of emerging patterns that suggest computer based learning is being approached differently in the early school years compared with the later primary years. These differences are evident in opportunity for students to learn with computer based technologies, the degree of teacher knowledge and expertise in utilising computer-based technologies, and the consideration given to learning that takes place with computers outside the home.

The discussion is organised around these three themes. What is being argued here is that the practices and attitudes, captured by these themes are not confined solely to computer-based learning, nor just to the primary school context, but rather reflect broader ideologies of young children and learning.

Limited uses of computer-based technologies

In all schools, the older primary year classrooms were prioritised over the younger year levels in terms of distribution of school computer based resources. All early years classrooms had fewer computers which were often older, of poorer quality and hand-me-downs from the older year levels. In contrast all principals ensured all upper primary year classes had “sufficient” amount of resources and in the case of Blane Primary School, allowances were also made to ensure Year 6 (rather than Kindergarten) had extra time accessing the computers in the library at lunchtime. In the case of Red Hills Primary School no objection was made by the principal to the year 6 class housing seven computers while Kindergarten only had two or three.

Distributing the computers in such a way impacted on young students’ opportunities for learning with computer based technologies in a number of aspects. Firstly older computers in the early years classrooms limited the potential for internet access for young students working in the classroom. No internet use was observed in any of the early years classrooms during the course of the study. Some teachers in the younger year levels expressed that they would like to use the internet but the limited access made it too difficult. In addition, a fewer number of computers could only result in young students overall spending comparatively less time on computers than the older students.
These limitations were further exacerbated by the additional restrictions placed on computer use by both classroom and computer teachers on young children’s time on computers. For example, in the case of Gason Primary School the teacher decided that the most suitable way for young children to use the computer was if she used the computer to create worksheets for them. In this class only those children in the most advanced reading group had the opportunity to use the classroom computers. In all schools computer teachers also restricted young children’s time on computers with computer skills lessons consistently encompassing large amounts of time where young students were required to sit on the floor and watch the computer teacher use the computer.

In all schools, young students were restricted in the ways they could use the computers. In each case study, young children only used classroom computers during reading groups time. Further to this, there was an over-reliance on the same type of drill and practise software during this time. In practise this meant that young students generally used the same software or the same kind of software for long periods of time for the same purpose. In the case of Blane Primary School, the same software was used in the same way with different classes year after year. In comparison, the older primary years classes were observed using the computers across different key learning areas in more varied ways and for more varied purposes.

Support offered to young children when using computers was also limited. In each of the case studies, young children were only observed either working on computers independent of the teacher’s assistance or interaction, or participating in highly structured, teacher-centred, activities where computer use was modelled. Compared with the older students whose time spent on the computer was more flexible, there was no or at best minimal opportunity for young children to discuss their learning and computer use with their teacher during the course of using the computer.

Such restricted use in the ways computer based technologies are used in the case study schools suggests a lack of valuing of and therefore commitment to computer based learning in the early primary school years. Classroom practice indicted teachers’ low expectations of all young students’ abilities to use a computer. This belief was evident not only by classroom and computer teachers but by the principals at Red Hills Primary School and Gason Primary School who indicated they had low expectations for young students’ use of computers and the internet. In fact they were not wholly concerned by the minimal or in some cases, no use of computers or internet by the younger year levels. What was interesting in both these interviews was that the principals communicated these sentiments in a tone suggesting that this was a generally accepted and expected state of affairs.

Recent academic literature suggests that the longstanding polarised debate about whether young children can and should use computers for learning is over (Clements, 2003) and that there is recognition that computer-based technologies supports and enhances learning (Yost, 2003; Kilderry et al, 2003). However all case studies suggest that in practise this debate is not resolved. Teachers expressed concern regarding the negative impact of
computer use on a young child’s development. Interestingly this concern was not
expressed by the only early childhood trained teacher participating in the study. She
instead expressed concern for the lack of commitment to computer based learning with
young children. This suggests that it is an overall lack of understanding of the capabilities
of young children as well as the potential learning gains for young children using
computer based technologies there is an overall lack of understanding of both the
capabilities of young children and of the potential of computer based technologies for
learning.

The early years teachers at both Red Hills Primary School and Gason Primary School
questioned the value of computers for learning in the early school years. The teachers’
judgments were based on how effectively and efficiently they thought computer based
technologies would enable children to develop literacy and numeracy skills compared
with more traditional methods. A number of points may be reflected with this. Firstly
there currently is strong and intensive policy commitment to literacy and numeracy
development in the early school years. Assessment procedures in place for tracking
student literacy and numeracy development rely heavily on achieving high scores in
standardised tests targeting the “basics”. In response, there is pressure on teachers and
schools for more explicit teaching; to focus on “old forms” rather than new (Cook, 2003;
Kilderry et al., 2003) to achieve for students to achieve these high scores. Pressure on
teachers in performing for major standardised tests, does not encourage experimentation-
teachers do not have time- nor do they want to take the risk. It is understandable that
computer-based technologies are therefore questioned as to when, how and whether they
are the most effective means for learning and achieving for this purpose (McKenzie
2004). In comparison, the year 5 and 6 teachers and principal from Blane Primary
School and Gason Primary reported the newly introduced Computer Skills Assessment
(DET) standardised test was placing pressure on them for student performance in
computer use.

There are no guidelines or policies for how schools use their discretionary funds nor how
computers accessed via the DET Computer roll-out are required to be distributed
throughout the school. Therefore, decisions regarding resource allocation reflect local
decisions. When reflecting on the principal at Red Hills decision to place computers
where he saw the need, it may be suggested that if his vision was developing computer
skills and he placed value on the process and outcome of the Computer Skills assessment,
that ensuring year 6 students had maximum computer access to allow for intensive
preparation for this final exam was understandably a top priority. Similarly in the case of
Gason Primary School, the “technology” team stemmed from the Stage 3 (year 5 and 6)
section of the school and it is clear their decisions reflected their own beliefs as well as
how they perceived the computer needs of the younger year levels.

These three cases studies indicate that a combination of differing curriculum priorities for
the various stage levels and a lack of policy guidelines have impacted on student
opportunity for computer based learning in the early primary years. While a spread of
computer-based technologies throughout the school is seen as important by principals it
appears that equity is not being viewed as equitable distribution but rather as the most
efficient way of using computer-based technologies to address “whole-school” curriculum priorities.

Not Building on Home Use

All three case studies indicate principals and teachers had minimal knowledge of children’s use of computer-based technologies in the home environment. The principal at Red Hills had conducted a survey to identify the level of access to home computers however this survey was completed in 2001. In acknowledging the rapid rise of home computer ownership in Australia (ABS, 2001) and changes in the school population it must be argued how relevant that survey is now. Interestingly previous to the principal stating in our interview the results of this survey he had reported to the research team that very few students within the school had access to a home computer. With this it must be questioned how, or whether, the survey was being used by the school when considering aspects of computer-based learning within the classroom environment. One teacher from Blane Primary School and one from Red Hills Primary School, working with anecdotal information, made deliberate action to ensure students who did not have access to a computer at home, had greater access to school computers, often in the form of , allowing students extra time on the computer.

Current literature (Rideout, Vandewater & Wartella, 2003) indicates that young children have dramatically increased the amount of time they spend using the home computer independently both in the years before school and after beginning school. As a result many young children are starting school with considerable computer skills and experience. Lessons such as those at Blane Primary School or at Gason Primary School in which students couldn’t use the computer until they were good readers, or until they had learnt the parts of the computer suggests that teachers had not taken into children’s home experiences with computers. These lessons assumed the students had no or minimal computer experience and reflect the broader academic literature that children’s learning with computer-based new technologies that takes place outside of school contexts is mostly not taken into consideration in educational contexts (Marsh, 2004). From the child’s perspective, these lessons also communicate the sentiment that computers are not there to take risks on or to experiment with. These teaching methods suggest to young students that there is one way to use a computer and that is the way that is being taught.

Teachers discussed the lack of educational value of home computer use. In the case of Blane Primary School and Red Hills Primary School, the teachers and computer co-ordinators described student home technology use as playing too many meaningless computer games that don’t have any educational value. This suggests firstly that school learning is valued above any learning that may take place in the home. It also suggests that computer activity a child participates in at home is seen by teachers to have no impact on school learning.

Learning via the home computer has become increasingly “curricularised” (Buckingham & Scanlon, 2003) with more and more software directed at teaching literacy or numeracy
or other core skills to young children, available for parents to purchase. With this type of software available in an increasing number of homes available for young children to use it may be argued that the pedagogical approaches and content young children are experiencing in the home environment with this software and the way the family is supporting children in their use, has a direct impact on the way children work with the pedagogy and content of the school learning environment.

A central focus of early childhood education is the importance of building on home practice. The case studies indicate that not only is there minimal interest and reflection of the home environment but also a uniform understanding of the home and the ways children use computers and other technology. While some attention has been given to acknowledging home computer access, there was no evidence in any of the case studies (in fact in the entire project) that schools were considering the various experiences and support children are experiencing in the home with the home computer and how this will impact on their learning at school. For the young child this reduces opportunity for their learning to be built on in meaningful ways. This suggests to families that the learning support they provide for their young child is inferior.

**Lack of teacher knowledge and expertise**

Overall teachers in the early years felt supported by their principal and key ‘technology’ staff however opportunities for informal professional or further professional development were mostly not acted upon. Lack of expertise by teachers in the early primary years was apparent in all case study schools. For many teachers such as in the case of Gason Primary School this lack of expertise had two concerns: the teacher wanted to use the computer in the exciting ways she saw them being used in the upper primary but was unsure how to simplify this for the ‘littlies’, in addition, she lacked expertise not only in her own ability to use the computer but in how to integrate computer based learning into the early childhood environment. For some teachers such as the Kindergarten teacher at Blane Primary School, trying to develop her own expertise and experimenting with ways to integrate computer-based learning was exacerbated with the limited resources available such as internet sites suitable for young children.

Lack of expertise was also evident in the ways teachers were able to work with syllabus requirements. The use of computer-based technologies is a component of every Key Learning Area syllabus for NSW Primary Schools. However, as the documents are broad rather than explicit in their description of expectations for the different stage levels, to the untrained eye, seeing the subtleties of how computer-based technologies are integrated into the curriculum and then how to apply them to their day to day teaching in the classroom is of course a difficult task. The teachers at Blane Primary School both indicated the importance of using the computer for educational purposes and the teacher at Gason Primary School questioned the value of students using games on the computers and therefore chose not to use them- instead using the computer herself to make worksheets to address the syllabus outcomes. Each of these teachers struggled with ways of using the using computers to enhance young children’s learning. Neither of the teachers in the case studies identified the syllabus as a source of guidance or support- in
fact none of the teachers in the case studies articulated the connection between computer based learning and syllabus outcomes.

As in the case of the teachers at Gason Primary School one distinctive feature of the lack of teacher expertise, was what appeared to be teachers’ choice in remaining uneducated in computer usage as well as in how to integrate computer-based technology into the school learning environment. For this school it raises the questions regarding the principal’s decision to allow voluntary professional development for computer-based learning and the compounding impact it may have on the valuing of computer based learning by these teachers and the subsequent possible lowering of opportunity for student learning with these technologies.

The ability to adequately prepare and feel competent and confident has greatest impact on using computer-based technologies in the classroom (O’Riordan 1999; Becker, 1999; Becker and Anderson, 1998). Overall teachers in the early primary years felt unskilled and professional development approaches in the school were not having a lasting impact on these teachers. For the most part, professional development that was being offered did not motivate teachers to see that value of computer-based technologies for young children’s learning. It can be suggested that more early childhood focused, professional development, focusing on motivating teachers to value the importance of it computer based learning for young children’s learning that develops skills in integrating it work with curriculum priorities is needed.

**Conclusion**

The three case studies of computer-based learning environments in NSW Government primary schools suggest that computer-based learning environments are being established differently in the early school years compared with the later primary years. With particular reference to three case studies, several aspects of the differing practises and attitudes have been described. These included: (a) limitations in uses of computer-based learning in terms of curriculum, resources, pedagogy, student use and potential for use, (b) not building on student’s home computer use and; (c) lack of teacher knowledge and expertise.

These themes illustrate a number of practices that have resulted in inequitable environments for learning. In comparison with students in the upper primary years, the case studies indicate that students in the early school years have reduced potential for learning with computer based technologies in the school environment.

All students regardless of age or learning needs should be given maximum support. In a school environment, to restrict one group of children’s opportunity for learning is iniquitous. Addressing each of these issues in isolation, or in fact combined, at the school level alone, will not ensure future computer-based learning environments are equitable. In this paper the argument has been made that factors external to the school are a vital
aspect contributing to this inequity. These factors include; government and system curriculum priorities for both the younger year levels and the older primary years, deficit attitudes to young children and learning, insufficient system guidance and support, minimal acknowledgment of home computer use and inconsistency at both the school and system level of the focus of computer-based learning.

Further study should focus on early childhood education in the context of the primary school and how this is distinct from early childhood in the before school years. Greater depth of understanding can then be applied to the specific needs of computer based learning environments in the early school years. Through the research described in this paper, various stakeholders in school computer-based learning environments may reflect on various factors which contribute to inequitable practise in this area and possible other things to consider in their own decision-making.

References


