LEARNING TO TEACH WITH TECHNOLOGIES

WHAT PRE-SERVICE TEACHERS SAY ABOUT THEIR EXPERIENCES

By Kathryn Moyle

University of Canberra, Australia

Abstract

It is the intention of the Australian Government, that over the next five years, as a result of the *Digital Education Revolution*, all secondary schools in Australia will have achieved computer to student ratios of one-to-one. This investment in infrastructure brings with it many challenges. Two of these facing Australian educators are:

- In what ways can advantage be made of such a significant investment in schools' infrastructure?; and
- What preparation do pre-service teachers require to enable them to meaningfully include technologies in their classroom activities?

To provide some insights into these two questions, this paper draws on data collected from pre-service teacher education students in 2008, as part of a larger, Australian Government funded research project listening to students' views and expectations of teaching and learning with technologies. In this paper, the data collected from pre-service teacher education students is used to provide insights into their views about including technologies into their teaching and learning activities during practicum; to gain insights about their views and expectations of the skills with technologies of their supervising teachers when on practicum, and of their university lecturers; and to reflect on their suggestions about how their courses could be improved. This paper highlights some of the issues and challenges facing Australian educators to prepare pre-service teachers to meaningfully include technologies into their future students' learning.

Introduction

In 2008, data was collected from pre-service teacher education students about their views and expectations of teaching and learning with technologies. This data was collected as part of a national research project listening to students' views of learning with technologies. Students in primary and secondary schools, in vocational education and training, as well as pre-service and early career teachers took part in the study. Data was collected through online survey and focus groups. In addition to the core suite of online survey and focus group questions, the pre-service teacher education students and the early career teacher participants in this study were asked questions about their views and experiences of their preparations to become a teacher. This study was informed by a literature review (Moyle & Owen 2008), of publications since 2002 that reported research which listened to students' views of learning with technologies.

The literature review (Moyle & Owen 2008) showed that many Australian young people have grown up knowing a life imbued with technologies such as automatic teller machines, computers, the Internet and mobile phones. Indicators such as household

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access to computers and the population's access to telephones and the Internet are used as indicators of progress and of economic productivity by agencies such as the Organisation for Economic Co-operation and Development (OECD) (cf OECD 2007; 2006; 2005; 2003). Similarly the Australian Bureau of Statistics (ABS) uses computer and Internet access by households and businesses as one of Australia's measures of progress (ABS 2004). Furthermore, Australia, like other comparable countries see the 'education industry' as an important contributor to Australia's Gross Domestic Product (GDP). The education industry in Australia provided 4.2% to Australia's GDP and represented 7.2% of employed persons in May 2006 (ABS 2008). Education exports in 2005-06 amounted to $3.981 million, as measured by fees paid to Australian education institutions by international students (ABS 2006). Government expenditure on education and training at a national level in the year 2005-06 was $59 billion or 6.1% of GDP (ABS 2006).

Against this backdrop, over the past two decades, the importance of including technologies in learning has been acknowledged in government and non-government policies and reports around the world (cf Commonwealth Schools Commission 1985; OECD 1998; Papadopoulos 1994; Standards Council for the Teaching Profession 1998; United Nations Information and Communication Technology (ICT) Taskforce 2003). In 2008, the Australian Government introduced the *Digital Education Revolution* policy which has committed $2.2 billion over four years to 2012, to provide mainly computer technologies to schools for use by secondary students in the school years 9 to 12 (Australian Government, Department of Education, Employment and Workplace Relations (DEEWR) 2008). These computers are provided through the 'National Secondary School Computer Fund' which is a component of the *Digital Education Revolution*. The aim of the *Digital Education Revolution* is to

> *contribute sustainable and meaningful change to teaching and learning in Australian schools that will prepare students for further education, training, jobs of the future and to live and work in a digital world* (Australian Government, DEEWR 2008: 1).

The *Digital Education Revolution* policy also committed the Australian Government to provide broadband connections to schools, with fibre to the premises (Australian Government, DEEWR) 2008).

The literature reviewed at the outset of the 'Listening to students' voices' national study showed that there is little recent Australian research about pre-service teachers' use of technologies either while on practicum or in their university studies. Research by Jones (2002) showed that when on practicum pre-service teachers tended to use technologies in the classroom more than their supervising teachers. Jones' (2002) research also showed that in general, little use of technologies was made by the supervising teachers of the pre-service teacher education students. The participants in Jones' research (2002) identified a lack of computer and Internet access, workload issues, lack of technical support and behaviour management issues as concerns that detracted from teachers including technologies into classroom practices. Other research with pre-service teachers has shown that the students in these studies report they are prepared by their university with basic technology skills such as word processing, Internet and presentation skills (cf Albion 2003; Markauskaite, Goodwin, Reid & Reimann 2006), but are not provided with support in how to meaningfully include technologies into their classroom activities and teaching and learning.

In this paper, the views of Australian pre-service teacher education students, drawn from the larger, national 'student voice' research project are outlined in order to consider in what ways advantage can be made of the significant investment in schools' technology infrastructure currently being made by the Australian Government. In so doing, this paper highlights some of the issues and challenges facing Australian educators to prepare pre-service teachers to meaningfully include technologies into their future students' learning.

Data collection

The majority of the pre-service teachers who participated in this research were preparing to become either a primary or a secondary school teacher. A total of 235 pre-service teachers completed an online survey and 25 pre-service teachers participated in five focus groups. Approval to collect data was provided by the University of Canberra, Committee for Ethics in Human Research. Access to individual universities was approved by that university.

Of the pre-service teachers who completed the online survey

- 74% indicated they were studying an under-graduate teacher education degree;
- 13% indicated they were studying a diploma of education; and
- 13% indicated they were studying a post-graduate education qualification.

These participants also reported they were in the following year of study in their teacher education qualification:

- 35% in their first year;
- 13% in their second year;
- 19% in their third year;
- 31% in their fourth year; and
- 2% in their fifth year.

Of the online survey respondents 86% indicated they were studying full-time and 14% indicated they were studying part-time; and 79% of the respondents indicated they were female, and 21% indicated they were male. The majority of the respondents had undertaken practicum in one (37%), two (21%) or three (23%) schools.

Findings

The data collected from the pre-service teacher education students in this study suggests that from their point of view, the opportunities on practicum for them to learn how to include technologies into their classroom activities, varied according to the schools and the teachers with whom they were placed. The main hardware and software reported to be available in practicum schools were interactive whiteboards, laptops, digital projectors, intranets, digital learning objects, and commercial software applications such as Powerpoint and Photoshop. Many of the participants in this study however, expressed concerns about the ability of both their university lecturers and their supervising teachers to assist them to learn how to include technologies into their teaching and learning while on their respective practica placements.

Figures 1 and 2 provide some insights into the pre-service teacher education students' views about the quality of the skills of their supervising teachers on practicum, and of their lecturers at university. Only 26% of the pre-service teacher education students thought that 'most of the time' their supervising teachers' skills with technologies were high enough to support them to include technologies into their classes while on practicum. Alongside of these findings, 74% of the pre-service teacher education students indicated to a 'medium' and 'high extent' that their lecturers' technical skills required improvement.

Figure 1: Pre-service teacher education students' views of their supervising teachers skills to support them to include technologies in their teaching and learning
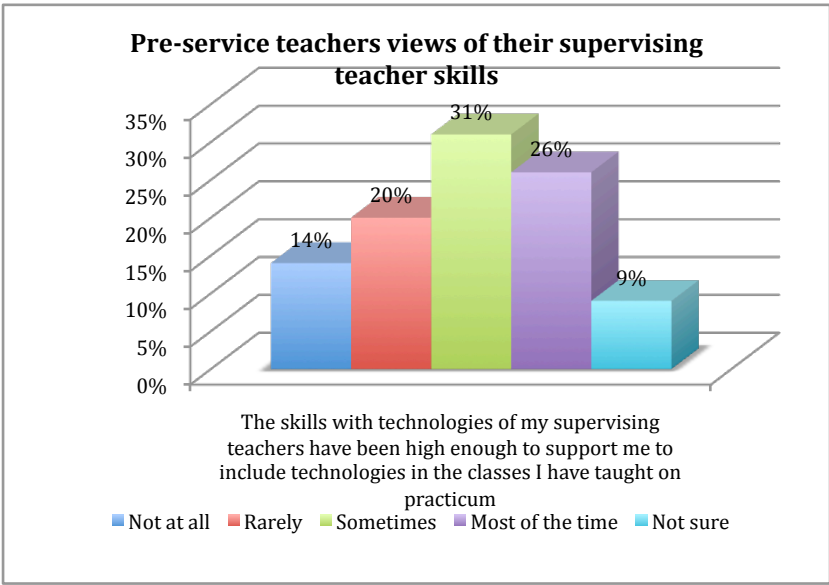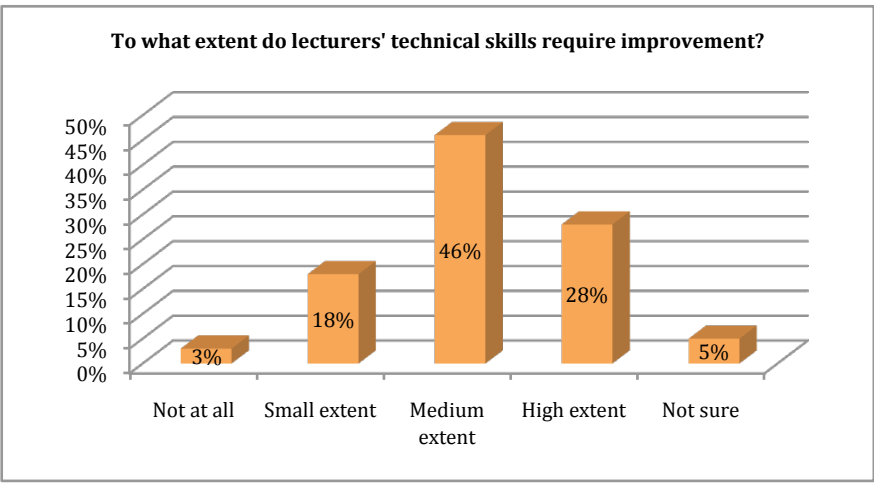

Figure 2: Pre-service teacher education students' views of whether their university lecturers' skills require improvement so they can support them to include technologies in their teaching and learning

Similar findings emerged from the focus groups. Pre-service teacher education respondents in the focus groups highlighted that the skills of their supervising teachers varied in quality, with some supervising teachers using little technology in their own teaching and learning, and having limited access to technologies in their schools and classrooms. These respondents indicated that they thought it was important that for their practica, they were placed into positive school cultures where there was a critical mass of skilled and enthusiastic teachers able to include technologies in their classroom activities, who could be their role models. But such sites for practica were not the common experience of the pre-service teachers in this study.
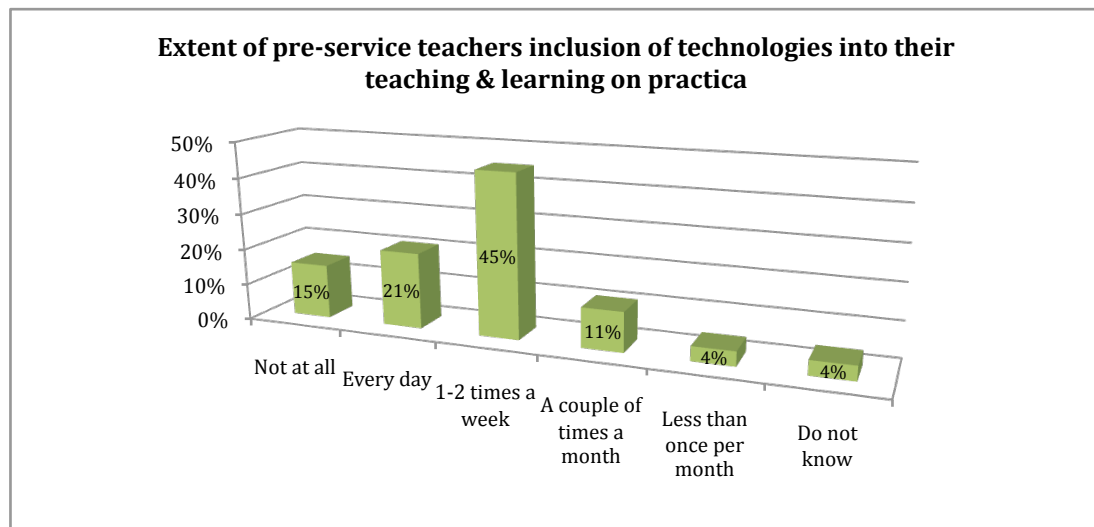
Findings from the online surveys summarised in Table 1 below, show that pre-service teacher education students suggest that teacher education courses would benefit from the inclusion of computers and the Internet in their lectures, and from the greater use of social networking sites. Furthermore they indicated that the knowledge of their lecturers about current directions in online games would improve pre-service teacher education studies. About half the pre-service teachers also indicated they had not received any guidance from their lecturers about how to stay safe on the Internet.

Table 1: Pre-service teacher education students responses about their views and experiences of their teacher education courses

Extent of agreement to the following questions	Not at all	Small extent	Med- ium	High extent	Not sure
To what extent should pre-service teacher education classes include computers and the internet in lectures?	1%	10%	44%	44%	1%
To what extent could pre-service teacher education benefit as a result of greater use of social networking sites?	3%	17%	45%	31%	4%
To what extent do you believe lecturers' knowledge of current directions in online games would have improved your pre-service teacher education?	10%	27%	28%	23%	12%
Did your lecturers assist you with strategies for keeping safe on the internet?	52%	28%	11%	3%	6%

Pre-service teacher education students were also asked their views about the impact of including technologies into students' learning, based upon their practicum experiences. It can be seen in Figure 3 that while about a fifth of the pre-service teacher education students who responded to the online survey did not include technologies in their teaching and learning at all or did so less than once a month, 45% reported they did so once to twice a week on practicum, and a further 11% indicated they did so every day.

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Figure 3: Extent to which pre-service teachers indicated they included technologies into classroom activities while on practicum

Extent of pre-service teachers inclusion of technologies into their teaching & learning on practica

Data from the focus groups also suggests however that these students included technologies in their practicum activities in spite of the support they received rather than because of it. Participants in the focus groups talked about disjunctures between what was taught at university as 'good' teaching practices and those practices evident in the schools into which they were placed. The following quote from a pre-service teacher education student is indicative of the sentiments expressed in the focus groups.

> On a couple of occasions I borrowed a data projector from the library and I brought in my own laptop. I was told putting that much effort into a lesson is not worth it: stick to the whiteboard and textbook. I was told that the best strategy is to get kids to do rote learning by copying what is put on the overhead projector.

Participants also raised concerns about the lack of access to technologies in the classrooms in which they were doing their practica. But the barriers to including technologies into teaching and learning expressed by the pre-service teacher education students, also concerned their own skills and confidence with classroom and behaviour management strategies. In the focus groups, these participants indicated they required the classroom management skills to include technologies into their practicum classes. The following reflection from a pre-service teacher illustrates this point.
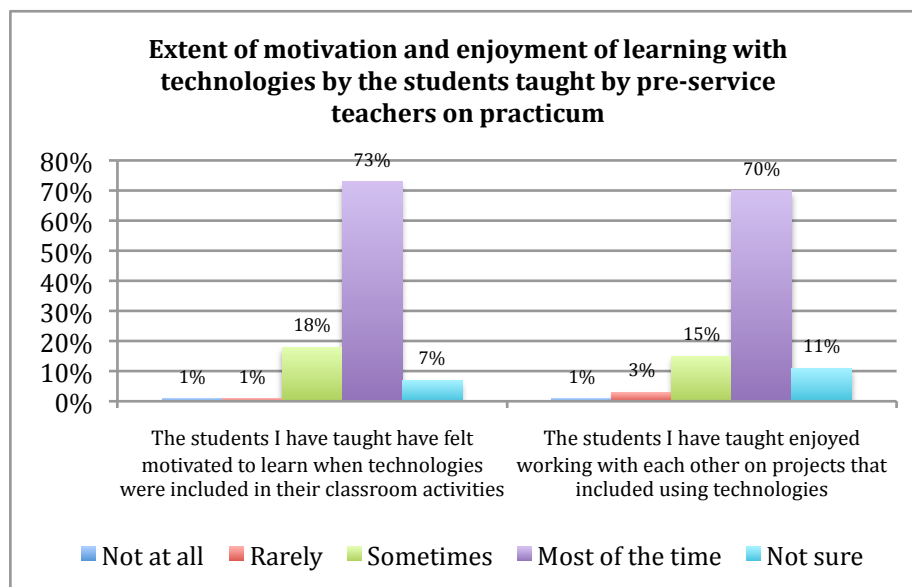
> I am still learning behaviour management. I find computer lessons a bit difficult if students want to be loud, silly, need constant help and supervision. I also find time-wise it is more beneficial to get a heap of books out of the local library to use for class research rather than spend a heap of time looking up websites that are usually too difficult for year 4's to read.

These findings suggest that while the pre-service teacher education students were keen to include technologies into their classroom activities while on practicum, they felt they did not receive enough guidance or feedback about suitable strategies to do so.

Many respondents to the online survey indicated though, that they thought their students were motivated and enjoyed their learning when it included technologies. Figure 4

shows that the the majority of the pre-service teacher respondents believed the students they taught during their practica felt motivated when learning with technologies and enjoyed working with each other on projects that included learning with technologies.

Figure 4: Extent of motivation and enjoyment by the students taught by pre-service teacher education students during their practica

There were also indications from some of the focus group participants that they had received positive encouragement to include interactive whiteboards in their teaching and learning. These participants reported that their skills in the use of interactive whiteboards improved during their practica.

Participants were also asked to respond to questions about what they expect of their lecturers' confidence and abilities with technologies. It can be seen in Table 2 they expect their lecturers to be confident in using technologies with their students and almost all respondents indicated they expect their lecturers to be able to use email to communicate with them. There was strong agreement expressed that teacher education qualifications should include units that specifically assist pre-service teachers to develop their skills about how to include technologies into their teaching and learning.

Table 2: Extent to which pre-service teachers agree about their lecturers' skills with technologies in their courses

To what extent to do you expect …	% responses Agree most or all of time
Lecturer confidence in using technologies	91
Lecturers using email to communicate with students	99
Courses building student skills using technologies	88
Courses incorporating technologies in teaching and learning to build skills educators ability to include technologies in their own teaching and learning in the future	88

Respondents to the online survey indicated that over the next 12 months they expect to use a range of technologies to communicate with their peers and lecturers as part of their studies. Table 3 below shows that over two-thirds of the respondents indicated they expect to be a part of chatroom discussions about their courses, but only 16% indicated they expect to contribute to a wiki. Over 40% of respondents indicated though, that they expect to use social networking sites to support their learning in the next 12 months. Data from the focus group participants suggested that the use of social networking sites to support their studies, were mostly initiated by the pre-service teachers themselves.

Table 3: Expectations of pre-service teacher education students

In the next year I expect I will …	% responses Most or all of time
Be part of chatroom discussion about my studies	69
Access an expert online	48
Check grades online	43
Use social networking sites	41
Check study requirements online	32
Take an online test	29
Contribute to a wiki	16

Responses to the online survey also showed that several of the expected purposes for using the Internet over the next 12 months were to be administrative, such as to check study requirements and grades online. Some of the participants in the focus groups indicated though, that one of the things they found daunting on practicum was how to use the school's online administrative system. Others however, commented with frustration about the lack of access they received on practicum to their school's online systems.

In summary then, the data from the national 'Listening to students' voices' study shows that many pre-service teacher education students included technologies into their practicum activities, and the students they taught on practicum enjoyed and felt motivated to learn with technologies. Only 26% of the respondents to the online survey however, considered the skills of their supervising teachers in schools were high enough to support them to include technologies into their practicum activities. Furthermore, an additional 34% of respondents considered that either 'not at all' or 'rarely' were the skills of their supervising teachers high enough to support them to include technologies into their teaching and learning activities while on practicum. The majority of respondents also indicated they expect their lecturers to have confidence with and to include technologies in their own teaching and learning.

The data also shows that a majority of respondents indicated either to a 'medium' or 'high' degree that their classes at university should include computers and the Internet, and that their studies would benefit from greater use of social networking sites. Just over half the participants also thought their lecturers' knowledge of online games would improve the quality of their pre-service teacher education. Finally, participants indicated that in the next 12 months they expect to use technologies to assist in their studies for both learning and administrative purposes.

Conclusions

This paper has presented some of the findings of the views of pre-service teacher education students drawn from the larger, aforementioned 'Listening to students' voices' research project funded by DEEWR. The responses from the pre-service teacher education students in this study suggest there is room for improvement in the quality of teacher education concerning the preparation of new teachers to include technologies into their classroom practices. Given these findings, and in the context of the *Digital Education Revolution* (Australian Government DEEWR 2008), if the Australian Government achieves its ambition of equipping all secondary schools in Australia with sufficient computers so that every secondary student has one-to-one access, then there are implications for pre-service teacher education arising from the installation of this infrastructure. The question then arises, 'what preparation do pre-service teachers require to enable them to meaningfully include technologies in their classroom activities?'

This paper has highlighted some of the issues and challenges facing Australian educators to prepare pre-service teachers to meaningfully include computers into their future students' learning. The challenges raised by the pre-service teacher participants in this study included the quality of both their practicum supervising teachers and their university lecturers, indicating that some had insufficient technology skills to support them during their practica. Participants also indicated that there was often a lack of access to technologies in the classrooms in which they were doing their practica placements. The concerns about infrastructure and equipment should be dealt with over the next few years, with the roll-out of computers and associated infrastructure through the *Digital Education Revolution*. With a national plan and funding in place to provide information technology (IT) equipment to schools, the complex challenges of upskilling current teachers, and developing the next generation of teachers comes into full focus. Concurrent strategies in the schools' and higher education sectors are required to support new and existing teachers to be able to thoughtfully include technologies into their classroom practices. To achieve such an outcome requires a time of reflection about the curriculum and assessment processes of teacher education; and to reframe the nature and processes of practica placements.

Pre-service teacher education students in this Australian study have indicated they feel they have to learn about and to build their student behaviour management strategies in order to confidentially include technologies in their teaching and learning activities. One condition required for pre-service teachers to gain confidence in their capabilities in classrooms is to provide opportunities to practice different teaching and learning approaches within risk-free environments. Indeed, the importance of being located in schools where the culture supports and develops a critical mass of skilled and enthusiastic teachers was emphasised by the participants in this research. It may be that the whole structure and content of teacher education ought to be revisited.

Including technologies in teaching and learning requires educators to rethink how and what they do, and to include technologies as an integral part of the activities being undertaken. Most of the pre-service teachers in this study had over five years experience using computers and the Internet. Their concerns did not rest on how to make the IT work per se, but rather upon understanding how to include technologies in authentic, integrated and meaningful ways for their students, so that the technologies added value to the learning. And it is here that the challenges for teachers and teacher educators, begin: at the intersections between teaching and learning with technologies, curriculum, assessment and reporting.

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