Paper 9

A SiMERRing Story: New approaches to professional learning for teachers in rural and regional areas of Australia.

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Abstract

The research project outlined in this paper aligns with the priorities of the National Centre for Science, ICT and Mathematics Education for rural and Regional Australia (SiMERR). A key aim of the Centre is to support the achievement of students and to promote teacher growth by working collaboratively with communities, educational authorities, professional associations and industry groups in the conduct of research and other professional activities. The Centre especially seeks to address problems faced by teachers in rural and regional areas who otherwise might be professionally isolated. The research project was conducted by members of the local SiMERR Hub located at the Australian Catholic University in Canberra. This SiMERR project brought together a university, teachers, learning technology officers and selected schools in rural, regional and urban settings to establish a dynamic professional learning community that facilitated the development of quality pedagogy and teachers improved sense of self efficacy, in the use of interactive whiteboards in their classrooms. All participating teachers had interactive whiteboards (IWBs) in their classrooms and had demonstrated some competency and enthusiasm for the use of ICT to enhance their teaching and their students' learning. The paper provides an overview of the research design adopted for the project, its underlying rationale and the methodologies used during the research development. A predominantly qualitative approach is utilised for the analysis of data gathered through questionnaires, semi-focused interviews with students and teachers, and lesson observations, including videotaped lessons of teachers' use of interactive whiteboards. The relationship between the project and the development of self-efficacy beliefs is also discussed.

Introduction

The introduction of information technologies (ICT) has been integral to education within the last decade (Lee & Gaffney, 2008). Instructors with high teacher self-efficacy are more likely to embrace new teaching strategies including the integration of technology into their pedagogical practice (Albion, 1999, 2001; Bruce & Ross, 2008). The appearance of interactive whiteboards within the classroom has been termed a 'revolution' (Betcher & Lee, 2009), and one that has the capacity to highlight the strong correlation between technology use and teacher self-efficacy. Perceived self-efficacy with respect to computers has been found to be an important factor in decisions about using them (Hill, Smith & Mann, 1987) and increased performance with computer related tasks was found to be significantly related to higher levels of computer self-efficacy (Harrison, Rainer, Hochwarter & Thompson, 1997).

Literature Review

Educational researchers have attempted to measure teacher efficacy and teachers' self-efficacy beliefs for the past 25 years (Bandura, 1997; Dellinger, et al. 2008), and the recent TALIS report highlights the links between self-efficacy and productivity and people's actions in the workplace (OECD 2009, p.5). Bandura (1977) argued it is through a person's sense of self-efficacy that behaviour is acquired. Personal self-efficacy is defined as 'judgments about how well one can organise and execute courses of action required to deal with prospective situations that contain ambiguous, unpredictable, and often stressful elements' (Bandura, 1977, p.201). When related to education, self-efficacy refers to teachers' beliefs or judgments about their abilities to teach effectively. Teachers with a stronger sense of self-efficacy are believed to be more open to new approaches and strategies for teaching and are more willing to implement innovative instructional practices that meet the needs of their students. When studying the relationship between teachers' workplace factors and teaching quality, Rosenholtz (1989) found that teachers were more committed, effective and more inclined to adopt new classroom behaviours when their own learning and classroom practices were supported.

The link between self-efficacy and learning strategies has been examined for sometime (Pittard, Bannister, & Dunn, 2003; Margolis & McCabe, 2004; Higgins, et al. 2005; Schuck & Kearney, M., 2007). The TALIS report (OECD, 2009, p.5) states that 'when teachers envisage effective teaching as a skill that can be acquired, this feeling of self-efficacy can help them better analyse and solve problems'. These teachers also persist in the face of student failure, are more resilient when facing setbacks, and are more likely to provide special assistance to students who are struggling (Tschannen-Moran, Hoy, & Hoy, 1998; Tschannen-Moran & Hoy, 2001). The inter-relationships between teacher-efficacy, empowerment of positive teacher-student learning interactions, and beneficial outcomes for students who are recipients of this process have been consistently recognised in research (Bandura, 1997; Wertheim & Leyser, 2002; Marat, 2007).

Early research of the impact of interactive whiteboards (IWBs), as they were introduced, focused on the management of change; teachers had to first become fluent in the use of the new technology and then develop an awareness of related classroom management issues. An extensive review of the literature regarding the introduction of interactive whiteboards in educational settings is provided by Smith, Higgins, Wall and Miller (2005). Their review notes that while teachers and students demonstrate a clear preference for the use of IWBs, it is unclear if this enthusiasm is 'translated into effective and purposeful practice' (p.99). They argue that the uniqueness and value of IWB technology 'lies in the possibility for an intersection between technological and pedagogic interactivity' (p.99) and that further research of practitioners' use of IWB technology as transformational devices is required if it is to be more fully understood and more coherently conceptualized (p.99). Betcher and Lee (2009, p.6) suggest the research indicates that IWBs are acting as 'an effective 'gateway' for many teachers to start exploring the further use of digital technologies in their classrooms'.

Teachers' beliefs have been shown to be a significant factor in the success at integrating technology (Albion, 1999; 2001; Albion & Ertmer, 2002; Becta, 2006, 2007). Lumpe and Chambers (2001) identify fourteen contextual factors impacting on teachers' beliefs about technology, and professional development was also found to be significant. The higher amount of technology use by teachers correlated both with the amount of professional development received and also with the time spent outside the classroom in preparation for instruction. Dean's (2001) study of the impact of a teacher-focused technology integration program, found computer attitudes and computer self-efficacy to be significantly higher following professional development. Further, it was found that the teachers' self-perception of their role changes dramatically from the 'sage on the stage' approach to one where the teacher operates more as a 'guide on the side'. The study also acknowledged the benefits for students from technology infusion efforts. Openness to change regardless of teaching philosophy or beliefs about one's teaching ability has also been noted as important (Vannatta & Fordham, 2004).

Saleh (2008) argues that from the viewpoint of self-efficacy theory, the ideal method for developing teachers' self-efficacy towards computer use is to provide teachers with training and support to work successfully with computers. Overbaugh and Lu (2008) determined that without a sufficient level of self-efficacy for performing computer tasks, technology integration may not even be attempted. Their research on the impact of professional development related to technology, combining online and face-to-face immersion courses, confirmed that these courses changed how participants taught and this resulted in an increase in students' learning outcomes. Furthermore, the elevation in efficacy scores was maintained over time (Overbaugh & Lu, 2008, p.56).

Although training programs may appear to focus on increasing technical proficiency, they can result in an increase in computer self-efficacy, changes in attitudes and belief systems, and heightened awareness of the potential of technology to enhance classroom teaching. The Saleh (2008) study involving tertiary lecturers, determined that 'focused training on specific software, applications to learning in their disciplines, developing confidence, and learning communities directed by faculty peers' (p.237) were more effective than extrinsic rewards.

Peery (2002) highlights the effectiveness of peer-led, open-ended and active classroom–based professional development for teachers and the importance of sharing this new learning. In an earlier study, Borchers, et

al. (1992) demonstrated that professional development over an extended period with on-site support for participants could be effective for increasing both self-efficacy and computer use. The use of peer trainers with high computer self-efficacy as mentors provides an excellent application of the vicarious experience component of self-efficacy theory. The trainers, who hold positive beliefs about the integration of technology and pedagogy, benefit by having their views reinforced and level of mastery increased as they share their expertise with others Saleh (2008) argues that although some barriers may deter the implementation of technology in teaching, it is imperative that strategies and techniques for increasing computer self-efficacy be incorporated into quality instructional practices as part of the 'paradigm shift into the information age' (p. 238).

Context

This research project aligns with the priorities of the National Centre for Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR), which, in 2006, was established to improve educational outcomes in Science, ICT and Mathematics for students in rural and regional schools. The Centre also aimed to ensure that teachers working in rural and regional environments would feel professionally connected and supported.

The increasing use of interactive whiteboards, especially in primary classrooms (Smith, et al. 2005; Kennewell, 2006; Betcher & Lee, 2009) and a desire to learn more about the potential of interactive whiteboards to strengthen pedagogical practice provided the impetus for the research project reported in this paper. Teachers in Canberra, in rural NSW, University academic staff and learning technologies officers (LTOs) from the Catholic Education Office (CEO) Canberra and Goulburn Diocese were involved in the project. Generally, LTOs work collaboratively with teachers in Catholic schools to provide professional learning focused on enhancing learning and teaching and to support the development of new technologies and resources. In this project, the role of the LTOs was to liaise with members of the research team and teachers in the field.

Participants in Phase One and Phase Two of the Project

- Three academic staff members from the Australian Catholic University in Canberra.
- Three Catholic Education Office staff members (Canberra/Goulburn).
- Fifty teachers from eight schools in rural and regional NSW and Canberra, ACT.

The project was conducted in two linked phases:

Phase One

Phase One of the SiMERR Project (2006-07) was titled: *Utilising the information and communication technologies to build a professional learning community to enhance the learning outcomes of teachers and students in rural and regional schools in NSW and the ACT.*

This phase of the project linked St Francis Xavier School, Lake Cargelligo, in western New South Wales, with five primary schools in the Canberra region. Collaboration between the teachers in these schools aimed to support peer mentoring in the use of ICT technologies in classrooms, and to facilitate the development of an effective and sustainable professional learning community. The participating schools already had a number of interactive whiteboards (IWBs) in their classrooms, and some teachers had demonstrated a degree of competency in, and enthusiasm for, the use of the boards to improve the quality of their classroom practice and strengthen the students' learning.

The identified outcomes from Phase One were:

- Development of a sense of ownership for the project by the participants;
- Establishment of effective professional relationships and sense ` of community between teachers in the various schools;
- Development of ICT skills through full-day forums, professional engagement and sharing of ideas and resources;
- Emergence of spontaneous mentoring between early career teachers and established practitioners, especially those with expertise in the use of IWBs;

- High levels of teacher motivation to broaden the scope of the project; and
- Development of strong University-school partnerships.

As Phase One neared completion it became evident that the skills developed by the teachers in the local Canberra schools, and who had more pre-project experience in the use of IWBs than their rural colleagues, were now at a level where peer mentoring was possible. This process was introduced during Phase Two of the project in 2008, which saw three more rural schools located at Cootamundra, Young and Temora, NSW, join the emerging 'professional learning community' with the Phase One teachers from the local schools assuming a leadership role in mentoring their rural colleagues. All three new rural schools had recently installed IWBs but little technological or pedagogical support had been provided.

Phase Two

During this stage of the project links were created between the three rural schools and staff from the research team, the CEO and local teachers in Canberra. Two Twilight Sessions were held in the rural town of Cootamundra in May and June 2008. These were well attended and required considerable commitment by the teachers from Temora and Young who travelled long distances after school and at the weekend to participate in this IWB professional learning experience in Cootamundra. At each Twilight Session, teachers who had participated in Phase One of the project presented a series of workshops in classroom locations at Cootamundra. The workshops were designed to build teachers' knowledge and skills relevant to their specific needs and those of their students within a supportive professional learning community. Written evaluative comments by participants show that this aspect was regarded as highly significant in contributing to the overall success of the sessions.

Members of the University research team and staff from the CEO in Canberra also travelled to Cootamundra to facilitate the sessions and work collaboratively with teachers. To further support the teachers, an interactive online professional network was set up to enhance the teachers' learning and communication with one another. Building on the Twilight Sessions, a weekend Professional Development Day was convened at the local school in Cootamundra to extend the teachers' knowledge and understanding of the way in which IWBs might be used to develop higher order thinking and enhance the teachers' pedagogical approaches in their classrooms.

Phase One and Phase Two Project activities consisted of:

- Three full day ICT forums held in Cootamundra and Canberra for a total of 40 teachers;
- Two Twilight professional development IWB sessions held in Cootamundra for 30 rural teachers, facilitated by 5 teachers from the ACT;
- A full day professional development intensive IWB training program in Cootamundra, on the pedagogy of higher-order thinking in classroom practice, for 30 teachers from Canberra, Young, Temora and the Cootamundra regions;
- The development of shared digital materials, IWB flip charts and teaching resources; and
- Set-up of a Western Region IWB information technology online internet sharing site.

Research Design Methodology

The methodological approach adopted for this research project was predominantly qualitative with some quantitative strategies used for the collection of data. These included semi-focused in-depth interviews with teachers and students, questionnaires, lesson observations, and videotaped lessons of teachers using IWBs in their classrooms. These were used during workshops for sharing and reflection. All interviews with teachers and students were audio taped and conducted in schools. The teachers were released from classroom responsibilities to be able to participate in the interviews during school time.

The research addressed the following questions:

- What benefits and costs have resulted from the establishment of a professional learning community for teachers and students in the participating schools?
- How has the use of the information and communication technologies assisted in building community and enhancing the learning outcomes for all participants?
- What implications are there from this study for the development of effective models of professional learning experiences for teachers in rural, regional and urban schools?

Interview Procedures

Eighteen teachers were interviewed to ascertain the development of their personal and professional use of IWBs in classroom practice. Questions were also asked regarding the concept of 'on-site' rural professional development and the creation of a supportive learning community. Each interview, which was tape recorded and transcribed, was on average 35-40 minutes in length and used to explore the impact of the two phases of the project. Using a semi-structured interview protocol constructed by the authors to guide the discussions, questions focused on the participants' attitudes toward the impact of the professional learning program on the their technology competencies, their willingness to integrate IWB use into their teaching and the effect on their students' learning. They clearly acknowledged that initially there was little support after the installation of the IWBs from the suppliers, and that they were very much 'on their own' in many respects in learning how to use the boards. Focus groups were also conducted with approximately 180 students who had been taught by these teachers.

Analysis and Discussion of Teacher Interviews

The following analysis of data obtained during the 18 teacher interviews provides an insight into the views and thoughts of these teachers on their learning journey.

Value of IWBs to teachers

The teachers' comments highlighted their growing perception of the value of the interactive whiteboards in their classrooms. As one teacher commented, she 'could not imagine being without it' and the use of the interactive whiteboard had given her 'a new lease of life trying out other things and manipulating objects'. Another teacher felt she now had 'a new focus'. Whereas previously, this teacher had spent a significant amount of time making and laminating resources, the ready access to resources through the interactive whiteboard had allowed her to use her time more productively.

The impact on teaching style was evident from comments such as:

> *My teaching style has changed because I can use a lesson now where I can plan for more student involvement. Before, when I used a blackboard and a whiteboard there was minimal involvement. Now I can plan so much more involvement. With the IWB my creativity, efficiency and time management have increased also. (Yr 5 teacher)*

Versatility in teaching and proficiency in technology resulted in teachers claiming, 'I think I was a very good teacher before. It has made me a 'deeper' teacher because I've been able to access all technologies e.g., the net, film, video and print within a lesson rather than separate from the lesson'. (Kindergarten teacher)

The qualitative data gathered from the discussion and interview groups suggests that using an IWB facilitates curriculum integration and the development of information and communication technology skills. A beginning teacher found the integration relatively natural,

> *I'm proficient in using the internet and all that sort of thing. It's been fairly easy for me to integrate it into my teaching. (Yr 5/6 teacher)*

The increased levels of IWB integration were consistent across the group to the extent where one teacher acknowledged 'the amount you can do on the board day to day is only limited by your imagination'. (Year 5/6 teacher) Increased satisfaction with their work was mentioned in most of the interviews. While a number stated that their prior ICT skills were almost non-existent and that the learning curve in the first few months was considerable, all teachers were adamant that they would not want to return to using a static whiteboard.

> *I've been teaching for a considerable amount of time and using an IWB is probably the most revolutionary thing I've done. (Yr 4 teacher)*

For a beginning teacher the experience was different, and the following comment is consistent with Hall and Martin (2008) that newer teachers report higher levels of self-efficacy in regards to technology.

> *... it's just a change of technology, the change in the way we are teaching. I'm learning in my first year out so I'm quite happy to learn anything, do anything. I'm not scared of technology, I love technology so for me it's just great training….., another PD opportunity for me that I'm going to have that I can take further and continue to learn. (Yr 5/6 teacher)*

Teachers commented that they were now more creative in the ways they use the technology. They tended to use a clear visual representation of concepts and ideas to consolidate learning, and often engaged every child in the class on a systematic basis in student use of the board. Teachers either obtained a wide range of ready-made resources to make mathematics, science and literacy activities interesting or developed these IWB resources themselves as their expertise increased. There was significant sharing of resources in local groups and through the online community.

Most negative comments were related to the technical reliability of the boards and the associated equipment. Some initial complaints also concerned the amount of time required to develop flip charts and other resources. These complaints, however, were often moderated by the positive comment that longer term use would result in more time efficiency as teachers developed higher level skills, a wider range of curriculum materials and shared resources with their colleagues.

Student Outcomes

Teachers interviewed during the project believed their students were more on task and more motivated.

> *I think that the behaviour issues are just non-existent with the [interactive] whiteboard because the kids are so interested in it. The inter-activeness is there in what they can see, and there is so much more available which is getting them to be more interested in their learning* and keener to learn. (Yr 5/6 teacher)

They also believed that the students covered curriculum content at a faster pace with much more capacity to extend and explore a subject in depth.

> *Definitely, if they're more engaged they're….getting more work done. You can certainly see that their interest level has increased, therefore their work is better. (Year5/6 teacher)*

> *They are more attentive now and they're more interested and they enjoy learning more when it's done with the board. (Year 1/2 teacher)*

Special emphasis was placed on the ease of scaffolding lessons and return to prior learning at the touch of a screen. Teachers stated that they were able to cater more effectively to a variety of multiple intelligences and that there was generally higher engagement of students with special needs, as indicated by Blanton et al. (2002) and Wall et al. (2005).

> *Being able to make your own flip charts just gives that extra visual, …with students who are visual learners, it's really good for getting them up to work on the board and building their confidence. (Yr 5/6 teacher)*

The opportunities for curriculum differentiation were more easily facilitated.

> *If you are doing a topic on optical illusions it is one thing to show them a picture and pass it around, but to have it on the IWB so they can see it and go up to see it more closely and manipulate the models ….. they don't want to go home because they get so involved in it!! (Yr 5/6 teacher)*

Significance of the Learning Community and Peer Trainers

The online learning community was seen by a significant percentage of respondents to provide ongoing professional support and development of best practice for isolated teachers. The fact that much of the project was facilitated in the rural location was particularly appreciated and the peer trainers were certainly valued.

> *[Peer trainer name] showing me what she had done with it and just having people around that knew what they were doing, that was really, really good, and they were very, very organised and it was run very well. (Yr 1/2 teacher).*

The credibility of the peer teacher was much appreciated:

> *It was good to be able to go up to some of those teachers and say 'What do you do with this?' Probably the best thing too about that was that they were willing to share any resource that they had and it didn't matter. (Yr 5/6* Teacher)

The concept of focused technology training identified by Saleh (2008) was confirmed in this study.

> *They had experience and we started in the low, low levels, we knew nothing and then it didn't really take that long to think 'OK, I am comfortable with doing this and this' and it's just you practicing. (Yr 5 teacher)*

Teachers spoke of the value of programs being made available in a folder or clip chart so that everyone could access resources through the network and acknowledged the reciprocity of the online community.

> *Now it's more you wanting to go and tell them rather than them coming and saying 'How do I teach this'? You go and say 'You know, I just had a fantastic lesson. I did this with the board, you should try it.' You are keener to volunteer ideas. (Year 5/6 teacher)*

Increase in Teacher Efficacy

Increasingly research confirms that there is a distinct need to implement new forms of continuous professional development in a workplace environment as part of a culture of lifelong and peer learning. (Balanskat et al 2006). Current research literature supports the contention that increased self-efficacy may have a beneficial impact upon motivation for teachers as they pursue improvement in pedagogical skills and professional knowledge. Teachers' poor ICT competence, low motivation and lack of confidence in using new technologies in teaching are significant determinants of their levels of engagement in ICT. These are directly related to the quality and quantity of teacher training programs.

A Year Six teacher's reflection highlights the importance of personal self-efficacy as a very influential construct in supporting the belief that the teacher has the skills to influence student learning and behaviour. (Bandura 1997)

> *I'm not an ICT person. When they first talked about computers in schools I prayed that they would not come. I would not say I'm computer literate now, but I am interactive whiteboard literate because that is a tool for my teaching. We've got to give the best to our kids and this is really helping me to do this. There is no saying 'No. I'm not going to do it!!'*

To be confident, teachers must be able to upgrade their ICT skills and gain more pedagogical knowledge in a much more active way than previously. Teachers have to become active shapers of their own learning process which requires a professional environment and culture that allows teachers to do this. The approach in this project using peer tutoring, and everyday practice was an important factor in increasing teachers' self-efficacy and pedagogical competence. Training programs were school-based and adapted to the particular needs of teachers in order to address their personal and subject specific needs, or project related needs. The locally based Twilight Programs, forums and full day professional development sessions were spaced at intervals over several months and provided practice oriented projects in day to day classroom pedagogy. This approach raised the confidence level of teachers as they developed a stronger sense of self-efficacy, were more open to new approaches and strategies for teaching and became more willing to implement new innovative instruction practices using IWBs.

> *I think the style of training used allowed us to do things for ourselves. Just like the children, that is the best way to learn and learn from your mistakes. The training model was so crucial to the success of this course. (Yr 5 teacher)*

Focus group analysis also identified greater teacher self-efficacy and further student learning enhancement

for the participants in this study. This affirms Saleh's (2008) contention that when low self-efficacy is not addressed, technology usage will suffer, but usage alone does not increase self-efficacy. Issues of effective technological support need to be addressed to overcome fears, particularly those that may be experienced by older teachers. In contrast to the younger teachers, older teachers confirmed that fear was initially a barrier for them. They stated that they were concerned or scared of the new technology and using it 'what if it doesn't work, or what if I have a problem ?' (Year 5/6 teacher) This was true for both rural and regional teachers.

The development of focused training courses led to elevation in teacher self-efficacy and correspondingly increased IWB use. Bruce and Ross (2008) comment that receiving positive and constructive feedback from a respected peer increases goal setting, motivation to take risks and implementation of challenging teaching strategies (p.347)

> *At the start we probably weren't using them to their full potential but now the more we have them in the room and the more you do and the more the months go by you learn more things, you talk to other teachers, you collaborate and from that you tend to start to use them more. (Year 1/2 teacher)*

Conclusion

This project shows what can be achieved when schools capitalise on positive attitudes and teachers are supported to explore new technology. The outcomes from this project also show clearly the benefits that accrue when teachers in regional and rural communities receive specifically tailored professional on-site learning opportunities that address identified needs. These experiences allowed the teachers to move from the 'novelty factor' in using new technology in their classrooms to a clearer pedagogic understanding of the impact that ICT can have on their day-to -day work in the classroom. The often-perceived mismatch between the potential of ICT for learning and the actual teaching approach used by teachers was narrowed. As the various groups involved in the project worked together, these collaborative partnerships significantly improved attitudinal factors, basic proficiency, and awareness of instructional potential leading to more equitable and sustainable learning outcomes for all. Increased self-efficacy resulted from practical training, providing easy to use ICT based materials and resources, peer learning and peer sharing of experiences (Watson, 2006). In doing this ICT was more clearly integrated into the schools resulting in an enhanced potential for it to act as a catalyst for even greater change.

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