Embracing Digital Technologies in Classroom Practice: The Impact of Teacher Identity

Rosemary Abbott
Loreto Mandeville Hall, Toorak

Abstract

It is often perceived that learning in 21st century classrooms will involve extensive use of digital technologies. This paper, based on a qualitative research investigation at a private girls' college in Melbourne, explores the impact of teacher subjectivities on the need to change through the integration of digital technologies into classroom practice.

This two-phase study involved a group of teachers who were willing to place their own practice under the microscope and to introduce digital technologies into their classrooms. A narrative approach was utilised to present the stories of these teachers and Activity Theory used as a means to analyse the data revealing the impact of teacher identity on preparedness to change.

Keywords

Teacher Identity, Digital Technologies, Activity Theory, Narrative methodology

Introduction

Hargreaves (1994) posits that "it is what teachers think, what teachers believe and what teachers do at the level of the classroom that ultimately shapes the kind of learning that young people get". The role of teacher is now more multi-dimensional than in previous generations (Groundwater-Smith, Ewing, & Le Cornu, 2001). Expectations beyond the classroom are now well entrenched and it seems that schools are expected to meet all of society's changing needs (Yates, 2005). However, the desire for change frequently emerges from within schools and is driven to varying degrees by the competitive nature of the school market; teachers are effectively "caught in the middle" (Groundwater-Smith, et al., 2001, p. 134).

The literature confirms the role of the individual teachers in both student achievement (Hattie, 2003) and in shaping the responses to change within a school (Ertmer, 2005; Hargreaves, 2005b; Zembylas, 2003). This particular research study emerged from a general interest in the use of digital technologies as a means of optimising good learning and teaching, and in the context of personal awareness of the experiences of teachers in a particular school. The teachers' work was central and my aim was to bring their experiences

to life. Anecdotally, and from my own observations, it seemed to me that at times both school leaders and peers made judgements about some teachers and their perceived resistance to embracing digital technologies. I was keen to investigate the accuracy of these judgements and discover reasons behind teachers appearing to be resistant to change.

The teachers' stories are central to the research and the narrative structure at various places is consistent with the research approach. To ensure the flow of this narrative, I have chosen to interweave the literature with the data at the point where the findings are discussed.

Setting the Scene

The two-phase qualitative study was undertaken in the school where I work. The research examined the underlying influences and processes that facilitated or inhibited the integration of digital technologies into teaching practice. In particular, it investigated the impact of teacher subjectivities upon practice in a digital learning environment. It appeared that for some teachers using technology in the classroom required a considerable shift in their normal practice and placed considerable pressure on them. It therefore seemed useful to focus on the teachers as individual human beings with particular experiences, beliefs and emotions as Palmer (2007) suggests it is necessary to look at the "teacher's inner life" (p. 3) or "selfhood" (p. 3) when contemplating making changes in schools.

This research has a sociocultural perspective, with the focus more on the teacher and less on the digital technologies (Goodson, Knobel, Lankshear, & Mangan, 2002). As already mentioned, a narrative methodology was used to bring to life the stories of a group of teachers and distil my reasons for doing this:

> "How to encompass in our minds the complexity of some lived moments in life? You don't do that with theories, you don't do that with a system of ideas, you do it with a story" (Cole, 1989, cited in Bochner & Ellis, 2002, p. 264).

The post-primary campus of the school, with approximately 700 students from Years 7-12, was the site for the research. Well-established traditions and a clearly articulated mission statement focussed on a positive vision for the education of girls was an important part of the school. Its curriculum was largely horizontal in structure and online via an extensive computer network and one to one notebook computer program had been in place for many years. All teachers at the school were provided with notebook computers and were expected to teach within the online curriculum (OLC) devised and used at the school. When this curriculum was being developed, teachers were given extensive periods of time during the school day for collaborative work to devise content. Once this initial work was completed, less time was made available even though teachers were expected to continue adding content and acquiring technology skills. The additional work was generally done after school or when teachers were free from classes, making collaborative work more problematic.

The Teachers

The teachers at this school faced similar pressures to teachers generally. Finger, Russell, Jamieson-Proctor and Russell (2007) argue that "demands are placed on teachers to accomplish more – but without additional time" (p. 93-94). Groundwater-Smith, Ewing and Le Cornu (2001) posit that "teacher's work is not a fixed set of practices. It is shaped by a series of interconnected, intersecting and sometimes contradictory influences" (p. 47). Because of the traditional and well-established nature of this school, the participating teachers were from a relatively narrow demographic with twenty or more years of teaching experience. They came from a variety of curriculum areas that included Science, the Humanities and English. Within the group, there were varying levels of ICT skills and awareness. Some teachers were enthusiastic users of digital technologies whilst others were reluctant and sometimes fearful. The teachers will be described in more detail through the stories presented.

Situating the study

Theoretical framework

The quest to discover an appropriate theoretical framework for this research was shaped by a view of learning encapsulated in the traditions of social constructivism emerging from the work of Vygotsky (Crotty, 1998; Forcier & Descy, 2005). Context is important, both in a sociocultural and socio-historic sense (Grandin, 2006). Therefore I sought a framework that facilitated the investigation of teacher attitudes and beliefs, and so recognition of cultural context was seen as a necessary component. In considering the use of Activity Theory, Nardi's (1996a) statement proved convincing:

> In Activity Theory, artifacts are mediators of human thought and behaviour; they do not occupy the same ontological space. This results in a more human view of the relationship between people and artifacts, as well as squarely confronting the real difference between people and things (p. 13)

According to Murphy and Rodriguez-Manzares (2008), Activity Theory "has been relied on to study contexts of implementation of innovation in education, such as when new technology is introduced and conflicts occur between teachers' beliefs and their actual practice" (p. 3). A number of other studies have dealt with the use of digital technologies in education and provide evidence of the productive use of Activity Theory (Arievitch, 2007; Feldman & Weiss, 2010; Robertson, 2007; Sannino, 2008).

According to Nardi (1996a), Activity Theory may be understood as both a theoretical framework and as an effective means of data analysis It is a way of investigating human activity and consciousness (Nardi, 1996a) where subject and environment are mediated by culture (Sannino & Nocon, 2008) in the form of tools or artefacts (Somekh, 2007).

Activity Theory can be seen as "a powerful and clarifying descriptive tool rather than a strongly predictive theory" (Nardi, 1996a, p. 7). It can provide a method of framing data analyses and interrogating the data generated through qualitative methodologies such as ethnography (Feldman & Weiss, 2010). Engestrom (1993, cited in Nardi, 1996a) makes no claim that Activity Theory provides "ready-made techniques and procedures" (p. 8), but rather provides assistance to researchers "by helping them ask meaningful questions" (Kaptelinin, Nardi, & Macauley, 1999, p. 32). This flexibility is appealing because it guides rather than dictates.

Principles of Activity Theory

Five principles inform the design of Activity Theory models (Kaptelinin, et al., 1999). The first principle, object-orientedness, indicates that all activity is directed towards an object, whether people or things (Kaptelinin, et al., 1999). The objects of activities may be seen as "objectives [original emphasis] that give meaning to what people do" (Kaptelinin & Nardi, 2006, p. 66).

The second principle is concerned with hierarchical structure, as activity may be analysed at three levels: activity, actions and operations (Leontiev, 1978, 1981, cited in Engestrom, 1999; Leontiev, 1974, cited in Kaptelinin & Nardi, 2006). At the top level, activity is driven by motives, and actions and operations are the processes required to fulfil these motives (Kaptelinin, et al., 1999). Action is concerned with particular goals (Ryle, 1999). Operations are seen as the bottom level of the hierarchy as they are tasks that are performed automatically.

Internalization and externalization constitute the third principle and these are "basic processes operating continuously at every level of human activities" (Engestrom & Miettinen, 1999, p. 10) where it is not possible to separate out "culture and society" (Kaptelinin & Nardi, 2006, p. 68). It is therefore necessary to analyse internal actions or processes in tandem with the external, because they result in the transformation that is the "very basis of human cognition and activity" (Kaptelinin, et al., 1999, p. 29). Furthermore, "it is the constant transformation between the external and the internal that is the basis of Activity Theory" (Kaptelinin & Nardi, 2006, p. 70).

The fourth principle, mediation, is central because of the Activity Theory focus on people and interactions with their environment (Kaptelinin & Nardi, 2006; Kaptelinin, et al., 1999). In particular, tool mediation plays both a functional and developmental role within interaction between subject, object and artifact (Kaptelinin & Nardi, 2006; Robertson, 2007) as internal and external tools can produce new actions. According to Kaptelinin et al. (1999), such interactions ultimately become internalized reality.

The fifth and final principle of development refers to both "the object of study" and "general research methodology" (Kaptelinin, et al., 1999, p. 32). Application of Activity Theory results in investigation of practice over time (Kaptelinin & Nardi, 2006; Kaptelinin, et al.,

1999). Usage of tools may not necessarily be continuous but development can result in them becoming more useful (Kaptelinin, 1996; Kaptelinin & Nardi, 2006) .

Engestrom (2001), presents an additional set of principles which can alternatively be viewed as characteristics or nodes (Russell & Schneiderheinze, 2005). Looking "for patterns of relationships in these nodes" (Russell & Schneiderheinze, 2005, p. 39) will provide a means of sorting data.

Activity

The activity system is the basic unit of analysis (Feldman & Weiss, 2010; Kuutti, 1996; Murphy & Rodriguez-Manzanares, 2008). It is "collective, artifact-mediated and object-oriented" (Engestrom, 2001, p. 136).

Multi-voicedness

Activity systems deal with multiple perspectives or points of view (Engestrom, 2001).

Contradictions

Contradictions are "historically accumulating structural tensions within and beyond activity systems" (Engestrom, 2001, p. 137) or "a misfit" (Peruski, Misra, Rosaen, & Koehler, 2007, p. 1649). Whilst such tensions may provoke negative responses, they may also promote change (Murphy & Rodriguez-Manzanares, 2008) and encourage reflection (Peruski, et al., 2007) through the questioning of norms (Feldman & Weiss, 2010). This can result in "collaborative envisioning and a deliberate collective change effort" (Engestrom, 2001, p. 137) or "conflicts and disturbances" (Engestrom, 2008, p. 382). Russell and Schneiderheinze (2005) describe teachers' responses to contradictions as "turning points" (p. 40).

Historicity

According to Feldman and Weiss (2010) and Kuutti (1996), awareness of the history of the activity system under investigation is necessary if that activity is to be understood. This construct of historicity also applies to artefacts or tools (Engestrom, 2001).

Expansive transformation

Here, links are made with contradictions within an activity system, which may cause individuals to "question and deviate from its established norms" (Engestrom, 2001, p. 137). When teachers begin to examine and question accepted practice, they engage in a process where innovation is likely to appear and become a part of practice (Engestrom, 1999, cited in Peruski, et al., 2007). Teachers' responses to contradictions may also result in transformation of the object through narrowing, widening, switching or disintegrating (Russell & Schneiderheinze, 2005, p. 40).

Models of Activity Theory

Three generations of Activity Theory model have evolved over time, emerging from the work of a number of researchers. First generation Activity Theory (Figure 1) emerged from the work of Vygotsky whose view was that all human activity was mediated by tools, language and theory (Feldman & Weiss, 2010; Robertson, 2008; Sannino & Nocon, 2008).

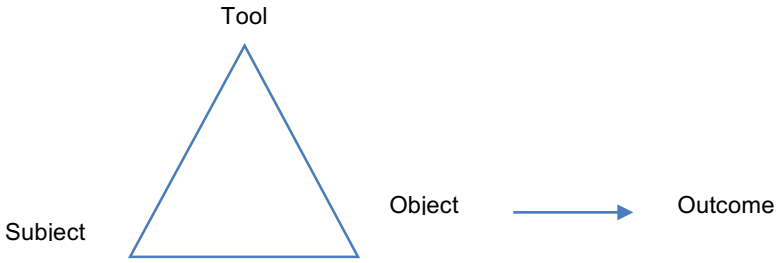

Figure 1. Generation 1 Activity Theory model
(Adapted from Vygotsky, 1978, cited in, Engestrom, 2001, p. 134)

In this model, activity is at the individual level (subject/person) and its purpose (object/outcome) is mediated by artefacts/tools (Robertson, 2008) that may be physical, cultural or theoretical (Feldman & Weiss, 2010; Robertson, 2007). Indeed, tools "embed and carry with them historical residue and specific cultural characteristics" (Kuutti, 1996, cited in Robertson, 2007, p. 5).

Second generation Activity Theory (Figure 2) was developed by Engestrom (1987, cited in Robertson, 2008) and based on Leont'ev's work on activity and recognising the importance of the social (Feldman & Weiss, 2010). It is based upon the first generation model with the addition of the participants or stakeholders of an activity (community) who are defined by their goal/s, the conventions or regulations of that community (rules) such as beliefs and norms, and what people do and their multiple roles/identities (division of labour) (Feldman & Weiss, 2010; Murphy & Rodriguez-Manzanares, 2008; Engestrom, 1999, cited in Robertson, 2008). These extra elements added "the cultural and historical milieu" to the model (Feldman & Weiss, 2010, p. 36) where activity is at a collective level (Robertson, 2008).

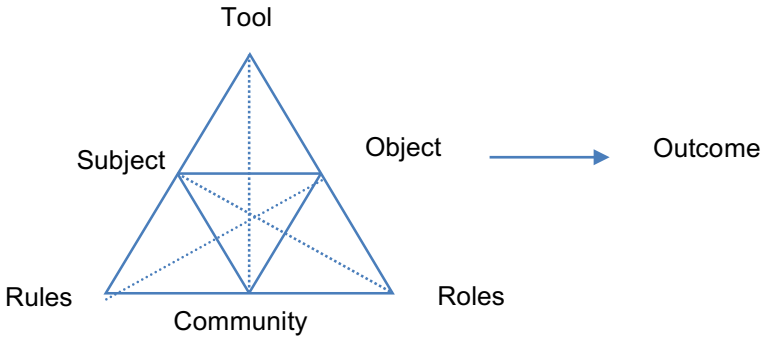

Figure 2. Generation 2 Activity Theory model
(Adapted from Robertson, 2007)

Models of Activity Theory in This Research

In the most recent model, third generation Activity Theory the activity is at the network level (Robertson, 2008), and two or more activity systems come into contact, resulting in tensions and contradictions (Engestrom, 1996, cited in Engestrom, 2008; Sannino & Nocon, 2008). However, the second-generation models were used in this study because of the focus on a single activity, which was changing the practice of a small group of teachers, rather than, by two or more activities interacting. Two separate applications of the second-generation models of Activity Theory were prepared specifically for each of the two phases of this study. For each of the two models, the activity is described and placed in context, which is vital to understanding the interaction of people, artefacts and social groups (Nardi, 1996b).

Phase 1 activity: Investigating teachers' perspective on practice in an online learning environment

Activity Theory provided much more than a snapshot of the use of the online curriculum and the use of digital technologies by the teachers. It was a means of explicating their actions, attitudes and behaviours. The Phase 1 model has been presented as Figure 3, below.

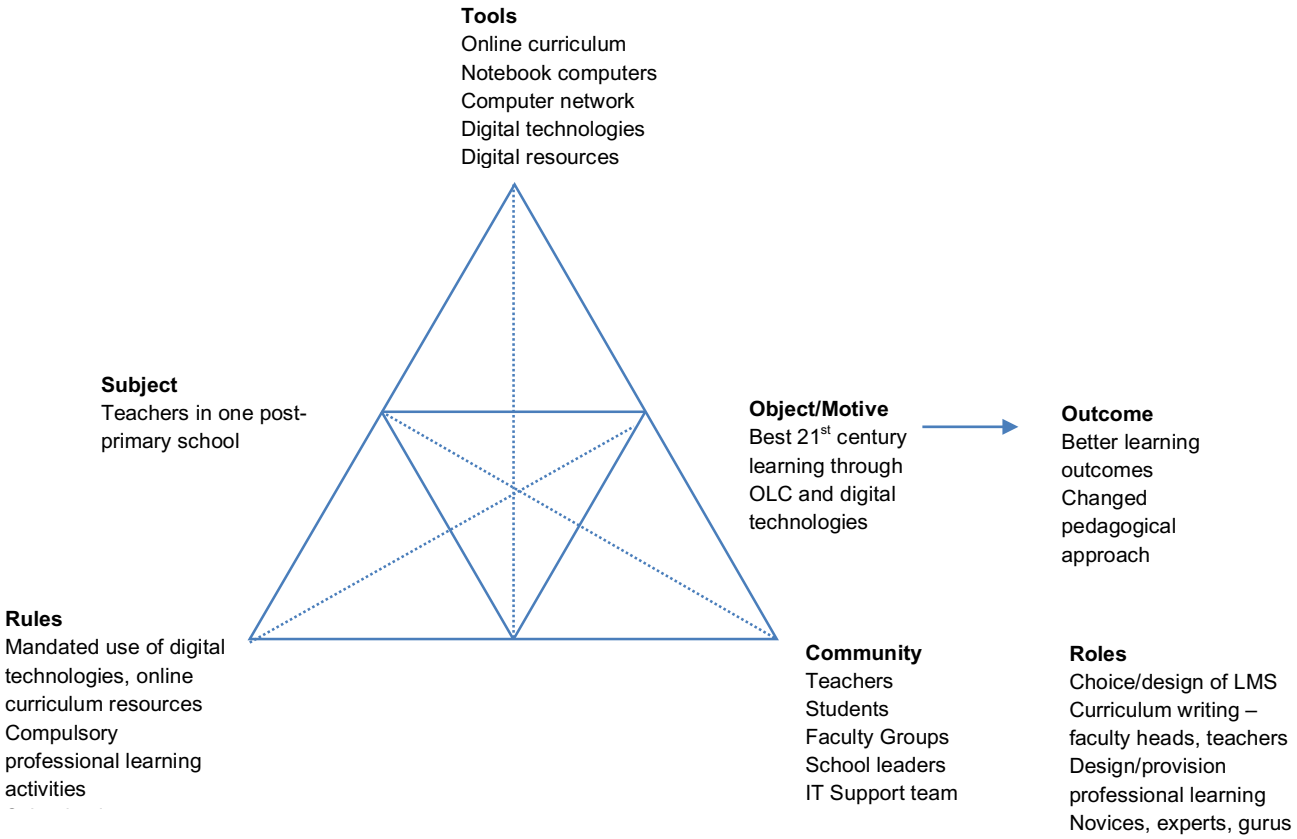

Figure 3. Phase 1 Activity Theory model

Activity

The teachers (Subjects) taught through an online curriculum (OLC) to integrate digital learning into practice (Object) for the 21st century. The anticipated outcome of their activity was improved student learning, increased teacher learning, self-efficacy, and potentially changed practices and beliefs. The teachers' actions were mediated through the design and delivery of the OLC, the use of notebook computers and other digital technologies across an extensive school wide network (Tools).

Context of the activity

There was an expectation that the teachers use the OLC extensively and contribute to the production of curriculum content (Rules). The use of notebook computers was mandated for both teachers and students (Rules). Teachers were required to acquire appropriate skills through associated professional learning activities (Rules). Teachers worked with peers, faculty heads, curriculum leaders and ICT staff (Community) to provide learning opportunities for students. The Head of IT chose the OLC platform and delivered the majority of the professional learning in-house (Roles). Faculty Heads were responsible for ensuring curriculum online was up to date with appropriate content and all teachers were expected to contribute to content (Roles).

Phase 2 activity: Teachers' changing practice through use of digital technologies

In Phase 2 of the research, the Activity Theory model (presented as Figure 4, below) was used to explore the teachers' responses to trying new practice.

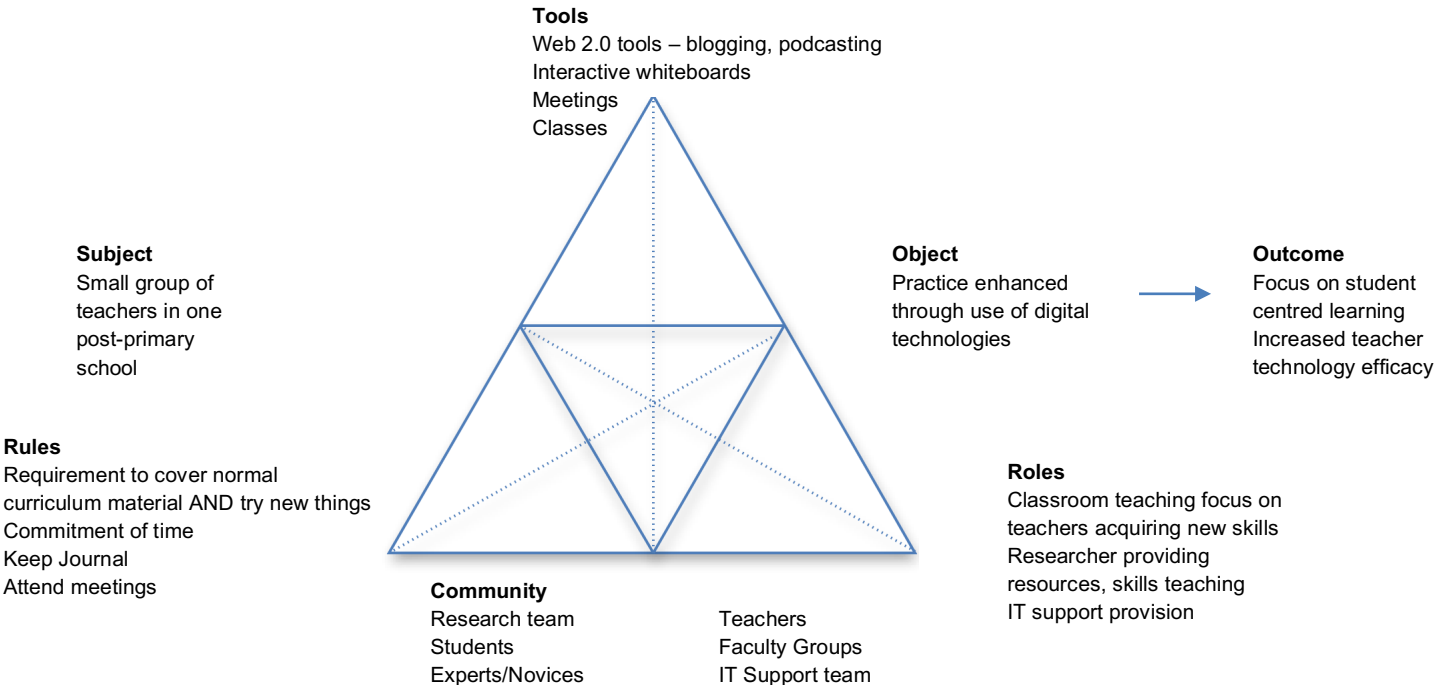

Figure 4. Phase 2 Activity Theory model

Activity

In Phase 2, teachers (Subjects) tried new approaches to enhance practice through the use of digital technologies (Object) in order to ensure best student learning and enhance their own skills (Outcome). Their actions were mediated by the particular digital technologies they chose to use – podcasts, blogs, discussion forums, and interactive whiteboards (Tools) and by their participation in group meetings and discussion and support for one another (Community).

Context of the activity

The participating teachers were expected to continue their normal teaching practice including the use of the OLC and notebook computers (Rules). The teachers became members of a professional learning team and participated in regular meetings as a locus of reflection, discourse and support (Community). The teachers acquired appropriate skills from within the team (Roles) and from external providers of professional learning.

Methodology

As stated previously, my preference was to tell the stories of the participating teachers. Narrative is a powerful way to understand human experience (Alsup, 2006; Bochner & Ellis, 2002; Clandinin & Connelly, 2000; Merrill, 2007; Riessman, 2008). It was essential that a strong thread of verisimilitude ran through these stories and this necessitated moving beyond a simple description of events (Clandinin & Connelly, 1996). The stories may be seen as "*retrospective meaning making*" (Chase, 2005, p. 656). I believed narrative would facilitate a focus on teacher identity (Alsup, 2006; Riessman, 2008). In addition, an ethnographic approach was seen as an appropriate means of data generation that could be analysed through the application of Activity Theory.

Method

The research was conducted in two phases and ran over a total period of 18 months. In both phases, participants were volunteers and pseudonyms were assigned. The first phase was intended to provide a snapshot of the realities of practice for the teachers, what they did each and every day, and what issues arose. This phase was intended to guide the structure of the second phase, by discovering what mattered to the teachers and the emergent issues for the school.

The first phase commenced after all teachers were invited to participate by responding to a series of email questions relating to the online curriculum they were expected to use and the online world beyond the classroom. 18 teachers participated, their participation providing implicit consent.

The questions were emailed in sets over a 10-week period. The responses to the emailed questions constituted the data source for this part of the research.

Sets 1 and 2 related to experiences with the School's online curriculum at the time;

> Sample questions: What do you see as the advantages in learning through an online curriculum? In terms of this specific online curriculum what do you see as the positives? Is the online curriculum a 'place' where you feel comfortable?

Set 3 sought responses to the online world;

> Sample questions: How much should the digital world influence the approaches to learning and teaching within a school? How would you describe your interactions with the online world, at school and in your everyday life outside school?

Set 4 asked about views of change and innovation;

> Sample questions: What do you believe are the major changes to learning and teaching necessitated by the school moving to an online curriculum? What strategies do you believe have been put in place by the school?

Set 5 related to professional learning.

> With regard to the online curriculum and the integration of digital technologies, what should professional learning involve? What has been your experience with professional learning associated with the online curriculum?

Teachers were invited to participate in the second phase and this participation was again voluntary. Consent was explicitly given through the completion of a consent form. This phase involved establishing a professional learning team. Members of this team worked together to change the way they taught by meeting regularly, sharing expertise and providing support. These teachers participated for a period of 12 months, integrating digital technologies into their classroom practice, where a student-centred learning focus was the goal. Each of the teachers chose which digital technology they tried. Some of what they chose was not necessarily very new, but was new for them. Examples of the digital technologies chosen included blogging, discussion forums, podcasting and lesson design incorporating use of the interactive whiteboard. Regular meetings were held outside school time. Over the 12-month period, relationships developed as the group provided support for each member, applauded success and sympathised with failure.

The data sources for this second phase included the team meetings, semi-structured individual interviews (both recorded and transcribed), teacher journals and my own research journal. The data generated was analysed for patterns and regularities. The data was then coded for emergent themes.

Using Activity Theory

In order to accurately portray the considerable complexities of the teachers' activities and experiences, a distinctive second generation Activity Theory model, referred to above, was devised for each of the phases. The application of the models was achieved through:

1. A detailed examination of the data in the context of interactions between the elements of those models; and
2. Sorting of the data for each of the identified themes using the key concepts or nodes of Activity Theory as a framework.

These key concepts: are activity; multivoicedness; contradictions; historicity; and expansive transformation (Engestrom, 2001). Contradictions are generally the main organiser as the tensions between the elements of the activity system presented the greatest potential to explain teachers' actions.

3. Incorporating the basic principles of Activity Theory, these being: hierarchical structures; object-orientedness; internalisation/externalisation; tool mediation; and development (Kaptelinin & Nardi, 2006).

Analysis of the Phase One data revealed teachers' beliefs and experiences, and the ways in which these mediated their uses of digital technologies. In essence, it provided a static view or snapshot of this group of teachers and the ways in which they worked with an online curriculum and notebook computers. Phase Two differed from Phase One in that it was the story of a smaller group of teachers who had volunteered to change practice through the integration of digital technologies. In this second phase, issues of identity also mediated the possibilities for new practice, and investigated what impacted upon this. The discussion incorporates data from both phases but focuses particularly on the teachers of Phase 2.

The teachers were a relatively homogenous group, perhaps unsurprising in a well-established, traditional school. The majority of those participating had at least twenty years teaching experience across a wide range of curriculum areas. Even the younger teachers in the group had been teaching for more than ten years. However, application of the key concepts of historicity and multivoicedness revealed diversity and therefore multiple experiences and perspectives.

Teachers had been at the school for varying lengths of time and consequently had different experiences as the school computer network was introduced and developed. The use of digital technology across the school increased over time, particularly with the introduction of a laptop program. Over time, there had been a number of versions of the online curriculum. The teachers also had experience of the development of the computer network over time, which was at times problematic. Multivoicedness was expected and enacted as the teachers undertook a range of roles within the school, including Heads of Department or School Leaders.

Stories from the Data

Accepting the argument of Day, Kington, Stobart and Sammons (2006), that teachers put themselves into their jobs, identity appeared central to understanding why the teachers in this study responded to the introduction of digital learning in the ways that they did. Palmer (2007) says "*we teach who we are*" (p. xi), and this sense of identity may be seen as a key variable to motivation and preparedness to change.

Broad views of teacher identity largely shaped the ways in which the teachers' responses were interpreted and included the following:

- Teacher identity develops through articulation of personal beliefs about being a teacher. It is multi-faceted and impacted by social and cultural factors (Day, et al., 2006);

- Professional identity is a "chorus of voices" with multiple sub identities and the potential for conflict within these (Mischler, 1999, cited in Beijaard, Meijer, & Verloop, 2004, p. 113);

- Teachers' dedication can make them vulnerable to the expectations of others (Day, et al., 2006; Kelchtermans, 2005);

- It is necessary to consider both the personal and the professional self in order to reveal teacher identity (Alsup, 2006).

According to Alsup (2006), identity also develops through the articulation of personal beliefs about being a teacher. What it means to be a good teacher has changed over time. Ertmer and Ottenbreit-Leftwich (2010) argue that being a good teacher in the 21st century must now involve the use of digital technologies. None of the teachers who were part of this study refuted this view. However, a number of them felt that other elements mattered just as much. Elizabeth commented that "*the teacher's passion counts*" and whilst Dana felt that it sometimes meant "sounding like the court jester", Louisa was certain that "*it does rub off if you are excited*". Teachers also need to know what they are doing and Elizabeth asserted that, "*confidence and expertise are necessary*". To this list, Dana added "habit" because she felt it was too easy to try something new once or twice, without making it a normal part of what a teacher does in the classroom. She believed there was temptation to go back to "the old ways" which Sannino (2008) describes as the dominant activity. Dana made the following powerful statement about her own professional identity:

> *We are teachers because we thrive on the value of knowledge, that we are inquisitive and still, underneath the complaints of being tired and having no time, we can be excited, committed to our subjects, that we want to be even better teachers, and that the education of students is of immense importance to us.*

A number of Dana's responses confirmed the view of Day et al. (2006) that negative shifts in identity can occur when teachers become vulnerable to the expectations of others. Dana believed she was a good teacher who achieved good results but she experienced conflict because she felt pressured to change how she taught by integrating digital technologies into classroom practice. She seemed to be waiting to be tapped on the shoulder and asked to explain why this had not happened. She felt weighed down with this additional "*brick in the backpack*", and on a number of occasions referred to her "*guilt*" and "*anxiety*", which Hargreaves (2005a) would identify as the emotional language used by those under pressure to change. Emotions play a central role in identity formation (Zembylas, 2003). They are central to the "*complex reality of teaching*". Dana's previously held beliefs were no longer on solid ground, even though she still talked about the value in going back to the "*old ways*". The following brief scenario illustrates her concerns.

Dana was in her classroom and had been using the interactive whiteboard but had abandoned this to do some revision work with her students, "*and would you believe Marilyn* [a senior staff member] *walked past and I am handwriting…this is so bad…how awful! Handwriting the whole summary. Going right back to the basics, but their comments were 'this is so good' you know*". Whilst Dana was horrified that she had been observed doing this, her students were delighted and an additional tension emerged. Her students' preferences seemed to be at odds with what was expected by the school leaders, thus creating tensions for Dana and the potential for contradictions within the community.

You can't be a Luddite – Elizabeth's tale of teacher self

In her year 7 English classroom Elizabeth introduced the use of an interactive whiteboard as a tool for her students to design their own newspapers. This was group work and some groups used the technology better than others. Elizabeth seemed oblivious to their progress, as she had moved to the corner of the room farthest from the interactive whiteboard. When I pointed this out later, she said, "*Yes! I let you into the scrum. I hung back in the coach's position saying nothing*". Elizabeth was very impressed by the students' cleverness with the interactive whiteboard, yet some of them were quite ineffectual in their use. My own observation was that the students were possibly exhibiting was Lave (1988) labelled a "*veneer of accomplishment*". Elizabeth was so intent on avoiding close involvement that she failed to observe this.

At the beginning of the second phase of the research, Elizabeth was very candid about her lack of ICT skills. In reference to Prensky's (2001) concept of digital natives, she said, "I'm not a native. What is the other thing you can be?" When I told her this was an immigrant, she laughed loudly. "*No, I'm not an immigrant. I am still in the home country and waving other people goodbye as they get on the ship*". Elizabeth professed to using technology as little as possible as she saw computers as gadgets, the use of which was akin to playing games: "*it's that tinkering, that playing around with stuff and I don't do that*".

Elizabeth's comment "I thought I could be your failure person" was made at our final interview, when I asked her why she decided to volunteer for the study. She thought that participation might force her to extend herself but she also believed she could provide me with a contrast to those who were more adept at using technology. She saw her identity as "*residing in something other than technology. That's why it doesn't worry me that I don't have any expertise in it*". Being an English teacher, she believed her identity was "*completely in the literal world of the book*". She went on, however, to contradict these views by telling me she was prepared to entertain the possibility of her identity being expanded to include the technological world, saying, *"you can't be a Luddite"*.

I began to think that, in fact, she was comfortable with her 'Luddite' self. What didn't worry Elizabeth was the possibility that she might look foolish in front of her students, which indicated she was prepared to be vulnerable (Day, et al., 2006; Kelchtermans, 2005). "*This* [technology] *is just another way of looking foolish, really, that I can embrace* [laughs]*...wholeheartedly*".

Contradictions arose for Elizabeth as evidenced by the conflicting ways in which she spoke of her own professional identity (Alsup, 2006). As an English teacher, her focus was on print, yet as a teacher in this school with its focus on digital learning she was well aware of the need to embrace the integration of digital technologies into her classroom.

Back to the home Country: Dana's tale

Dana described herself as a "*reluctant immigrant*" when it came to digital technologies, although she recognised the need to use them. "*I need to be more proficient with technology because that's the world the girls are growing up in*". She did in fact use digital technologies in an additional role she had in the school. Despite this, she feared that her students might see her as masquerading as a "*technologically proficient teacher*". Certainly, she contrasted her skills to those of her more technologically aware colleagues. She pondered that, if her students were in those teachers' classes, they might have felt technology had more potential.
Dana described her initial enthusiasm for participating in the research. The Smartboard™ (interactive whiteboard) had arrived in the school; her desire to start using this meant she could also contribute to the research. Dana's enthusiasm began to wane as she observed the students' diminishing interest. "*You know what? My feeling is they're bored with it*". She was, however, prepared to concede that perhaps this view was based upon "*reluctance on my part to embrace it wholeheartedly*". Her belief was that the best classes were where there was discussion and where she sensed focus and engagement. Despite this, Dana had prepared many online resources that utilised the interactive whiteboard (IWB), but she felt that there was less dialogue between her and the students when the IWB was being used. It didn't sit well with her pedagogical approach of writing, talking, writing, talking and her perception that the pen was still an important part of the process. As well as being a science teacher, Dana is a creative writer and she believed that this influenced her attitudes. Dana's beliefs about technology were strongly held and appeared to impact upon her professional identity (Ertmer, 2005).

She laughingly described her preference for going back to the home country "*like the old Greek way*" where she and her students wandered outside and they hung on her every utterance. Dana considered that students were so familiar with technology that "*some older methods* [of teaching and learning] *are the novelty*". Both Elizabeth and Dana demonstrated contradictory attitudes to what they perceived were institutional expectations regarding the use of technology (rules). They both described their reluctance to embrace technology, yet their actions (including their participation in the research) suggested that they were prepared to adapt their practice. They felt they should be using technology more, but also had strong beliefs in their teaching abilities (Ertmer, 2005; Friedman & Kass, 2002; Somekh, 2008), which seemed to diminish any pressure that might have been imposed from above and thereby mitigating contradictions. Whilst similarities were observable between Dana and Elizabeth, Annabel took a very different position as evidenced by the following tale.

Somebody actually cared what I was doing: Annabel's tale

An opportunity emerged for Annabel when the science classrooms she used were refurbished and equipped with new digital technologies. In particular, it was the arrival of interactive whiteboards into these rooms that acted as a catalyst for a significant change in her teaching practice. The invitation to participate in the research study arrived at just the right time. "*I could see myself going to work on that* [the interactive whiteboard] *a great deal, so I saw your invitation to be involved as just a bonus."* What she tried over the course of the study was what she intended doing anyway.

Initially Annabel chose to work with a junior mathematics class. They participated in an online discussion forum, where the discussion threads focused on how they learned mathematics. After a relatively short time, she decided that it had not been particularly successful and she would prefer to switch to work with her senior Chemistry class using the interactive whiteboard. When she began working with this class, there was a certain element of frustration about the vacuum in which she felt it was all happening. "*You work totally alone. I'm doing it just for me. You get no feedback from the girls or anybody else, and in a way, you're not looking for it either*".

At times Annabel was content with merely participating in the research and didn't desire acknowledgement beyond the group. On other occasions, she seemed resentful that others were unaware of how much extra effort she was putting into her classes. Unlike Elizabeth and Dana, she didn't particularly worry that she wouldn't be capable of using technology in her classroom. What emerged was a need for recognition and feedback, (Reina & Reina, 2006). Annabel frequently expressed concern as to whether she was making sufficient contribution to the research. Her desire to assist me was, I believe, indicative of a strengthening relationship, associated with a growth in mutual trust (Hargreaves, 2001; Witherell & Noddings, 1991). It seemed that this relationship had some mediating effects when the use of digital technologies (object of activity and the tools themselves) became problematic and created contradictions for her.

The above stories provide some insights into how the three teachers saw themselves. The role of experience can be observed woven through these stories. Fundamental to teacher identity are beliefs (Rokeach, 1968, cited in Ertmer, 2005), and in particular, the ways in which the teachers recognised "the capacity to perform at a given level of confidence" (Bandura, 1993, p. 118). This capacity has been identified as self-efficacy (Dellinger, Bobbett, Olivier, & Ellett, 2008; Goddard, Hoy, & Woolfolk Hoy, 2000; Tschannen-Moran & Woolfolk Hoy, 2001) and is necessary for teachers wishing to use unfamiliar digital technologies in their classrooms.

Self-Efficacy

Bandura (1993) posits that "*It is difficult to achieve much while fighting self-doubt*" (p. 118). Self-efficacy beliefs dictate the degree to which people will persevere (Tschannen-Moran & Woolfolk Hoy, 2001) and overcome this doubt. The individual teachers' beliefs about the use of learning technologies in learning were shaped by experience (Ertmer, 2005). Good experiences are necessary if teachers are to adopt digital technologies since technology self-efficacy is particularly affected by experience (Ertmer & Ottenbreit-Leftwich, 2010).

Bad experience can be an impediment to adoption (Mumtaz, 2000, cited in Somekh, 2008). Feelings of control also have an impact of self-efficacy. Louisa was a particular case in point. Louisa's levels of technology efficacy were low, by her own admission. When she introduced blogging to her English class, the result was excitement by her students. She had set aside lesson time for her class but success seemed elusive. Contradictions soon emerged within the activity as Louisa insisted on vetting the posts for both grammar and content before students were permitted to publish them. The time this process took, combined with some technology issues, resulted in an unsuccessful attempt to integrate digital technologies. It appeared that this change in practice created tensions for Louisa and threatened the stability of her classroom (Goodson, et al., 2002). The resultant contradictions of negative tool mediation were never resolved and Louisa's self-efficacy did not strengthen. All of this seemed to support the view that bad experiences have an impact on technology efficacy (Mumtaz, 2000, cited in Somekh, 2008), and it was perhaps unsurprising that she withdrew from the research before phase two was completed.

As already mentioned, teachers were expected to use digital technologies in their classroom practice. It was therefore necessary that they saw themselves as being capable of meeting this expectation, of being self-efficacious (Goddard, et al., 2000; Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Frances wrote, "*I told you I wouldn't be able to do this*", when unable to attach her response to the first series of questions. This appeared to be an example of the negative impact of tool mediation caused by lack of skill and confidence. In contrast, both Patricia and Simone blamed the technology and appeared not to see personal deficiency as being the cause of their inability to save the email attachment. The teachers' responses exhibited varying degrees of technology self-efficacy as identified by Ertmer and Ottenbreit-Leftwich (2010).

It was anticipated that the element of historicity would come into play with younger teachers exhibiting greater confidence in their abilities to use digital technologies. However, this was not always the case as shown by a comment by Simone, one of the younger teachers, "*if a pencil breaks I can sharpen it or provide a new one*" whereas computers "*fail frequently and are difficult or impossible for the classroom teacher to fix*". Kate, another younger teacher, exhibited greater self-efficacy when she explained that "*once I've figured out how to do the things I need on it* [OLC], *its ok*" but she still would have preferred "*a significant dedicated period of time to learn how to use it rather than piecemeal learning of what I need for immediate use*". Rebecca, again a younger teacher, described herself as being "comfortable" in her use of digital technologies but she explained that to be confident "*you always need to have an alternative plan*" in case of technical difficulties.

A number of the teachers with more years of experience than Simone, Kate or Rebecca also exhibited considerable self-efficacy in their approach to digital technologies. For example, Martin, who was new to the school at the time, was clearly a confident user of digital technologies in and beyond the school, explaining "*I make use of digital technology on a daily basis for both information, work and personal purposes*". His use included managing a website, and using a variety of software for writing articles and developing lessons. Patricia as an IT teacher was clearly confident in her use of digital technologies, largely because it was what she did on a daily basis. It seemed that historicity in the sense of generational differences (McCrindle, 2009) was not a clear indicator of technology efficacy, as both Martin and Patricia were teachers of long standing.

It appeared that bad or negative experiences could produce negative views of the teacher's own technology efficacy and influence the use of digital technologies in the classroom (Ertmer, 2005). This was the case not only for Simone (as above), but also for Linda, Louisa, and Frances as contradictions emerged when digital technologies were unavailable, access was too slow, and such difficulties resulted in the technology becoming the focus of the lesson rather than the learning. Here the mediation of these tools had a negative impact, as the object of the activity was subsumed, and there were inhibitors to adopting digital technologies (Mumtaz, 2000, cited in Somekh, 2008).

Confidence needs building through experience and success in the classroom. This takes time and requires professional learning that fits in with the teachers' work. A lack of experience can be a major inhibitor in the adoption of digital technologies (Mumtaz, 2000, cited in Somekh, 2008). Frances appeared to avoid acquiring experience, writing:

> *I have relied heavily on people in my department who are computer experts and can do this work for me, particularly putting work on Moodle [OLC]. If we have sessions after school I forget it as soon as I walk out of the room because it is all so unfamiliar.*

Stephen alluded to his own low technology efficacy (Ertmer & Ottenbreit-Leftwich, 2010) when asked about the disadvantages of online learning and explained, "I am still not sufficiently comfortable with the mechanics of Moodle to easily and quickly put new information on the online curriculum – it is much easier to dash to the photocopier". His lack of skills and time meant that he often searched for a non-digital method, and thus a contradiction emerged with the rules of the activity.

In contrast to both Frances and Stephen, Charlotte explained, "*the teacher must be seen to be a learner too*". It appeared that she was willing to expose herself to experiences with digital technologies and she did this in a number of ways. She saw value in her own informal learning, and dealt with challenges by "*doing my own thing…in an idiosyncratic manner which suits my style of delivery*". If she was unable to use a particular digital technology, she was happy to rely on her students to teach her the necessary skills. If experience is the key to strong self-efficacy (Ertmer & Ottenbreit-Leftwich, 2010; Tschannen-Moran & Woolfolk Hoy, 2007), it seemed that Charlotte was likely to overcome contradictions within the activity, through what has been described as turning points (Russell & Schneiderheinze, 2005).

Strong self-efficacy and collective efficacy are indicators of resilience and persistence (Tschannen-Moran & Woolfolk Hoy, 2001) and it seemed that these characteristics were more easily identified in the second phase of the study. This was possibly because there were increased opportunities for reflection and discussion by the smaller group of teachers.

Elements of multivoicedness arose from the varied experiences of the teachers and how they saw their teacher selves.

Oscar displayed strong technology self-efficacy (Ertmer & Ottenbreit-Leftwich, 2010) throughout the course of Phase 2. His decision to use podcasting and iTunes™ arose because he had acquired the appropriate skills in his own time. Apart from a brief discussion with Bill, the head of IT, no opportunities arose within the school's professional learning program. Oscar's levels of confidence in using digital technologies had earned him the status of guru, particularly within the research team and the assigning of this role created tensions (contradictions) for him (subject). He spoke at some length to the group about the technicalities of podcasting and Louisa exclaimed, "That was language you could almost understand". He persevered with podcasting, despite many problems with access creating contradictions between digital technologies (tools) and his purpose (object). This was perhaps because his confidence also extended to requesting and expecting support from the IT technicians. He was able to overcome negatives instances of tool mediation and expansive transformation (Engestrom, 2001) occurred as he was able to introduce new practice that permitted his students to effectively use digital technologies and to take more responsibility for their own learning.

Annabel began her participation in Phase 2 with considerable enthusiasm and seemingly strong technology efficacy. She was already making extensive use of the interactive whiteboard but was keen to use it to improve student learning, as well as learning how to use other digital technologies. It takes time to increase confidence (Ertmer & Ottenbreit-Leftwich, 2010) and Annabel showed that she was prepared to persevere with using digital technologies in her classroom as she participated from the beginning of Phase 1 until the second phase of the research concluded in June 2008. She made a number of switches from a discussion forum with her junior mathematics class to a senior chemistry class and back again several times. With each change, she spent time acquiring the necessary skills from a variety of sources including the head of IT and external professional learning activities. She saw the skills she acquired as "no big deal" and necessary to keeping up. When Elizabeth and Dana showered her with praise for what she had done, she became irritated and continually downplayed what she had achieved. Paradoxically, Annabel displayed strong self-efficacy, thereby successfully meeting the object of the activity and mitigating contradictions, and yet she seemed unwilling to accept acknowledgement of this.

Additional factors emerging from the Research

A number of other factors, linked to teacher self, emerged in the research. These had the potential to create contradictions within the activity of phases one and two. In some cases, they were the source of tool mediation; in others they meant that contradictions were never resolved.

Trust emerged as an issue in the first part of the research. One teacher, Charlotte, in talking about student use of computers in class said, "*Trust is a huge issue here*". Other teachers made similar comments, "*they're clever and can hide things*", "*they have too many temptations*". The teachers often felt unable to trust students because they faced distraction and temptation through the use of learning technologies. They saw a need to spend learning time monitoring and enforcing appropriate use. I should point out that this negativity greatly diminished in the responses from the professional learning team in the second phase. Elizabeth introduced blogging with a very brief discussion on appropriate behaviour and then let the students loose. This was because she trusted them and this in turn introduced in the students a desire to be trustworthy.

Trust is necessary if people are to work together and this working together can itself build trust. Hoy & Tschannen Moran (2003) describe trust as *"..An individual's or group's willingness to be vulnerable to another party based on the confidence that the latter party is benevolent, reliable, competent, honest and open – this is confidence in the good will of others*" (p. 183). In phase two, membership of the professional learning team provided opportunities for trust relationships to develop. Group meetings often produced examples of caring and concern, support and affirmation. Positive responses came from the teachers. Annabel said, "*You've been interested – it's been nice to think that somebody actually cares…and is actually noting that I am putting some energy into what I am doing*". Louisa, frustrated by the difficulties she was experiencing, persevered saying, "*It is just as well I like*

you". Elizabeth saw that her participation had resulted in "ongoing relationships with people in the school where you can go "*well what are you doing now? How has that been going?*" According to Bryk and Schneider (2002), relational trust facilitates the development of beliefs, values, organisation routines and individual behaviours that instrumentally affect engagement and learning. Yet is seems that little attention has been paid to trust in schools, despite the impact low levels of trust can have (Louis, 2007). Building trust takes time and occurs incrementally (Blase & Blase, 2001). Together teachers' professionalism and good leadership build trust. It can also be built through positive communication and shared vision. Strong trust increases the likelihood of teachers being prepared to take risks and embrace change (Bryk & Schneider, 2002). Hargreaves and Fink (2006) argue that it is "*the first fatality of imposed reform*" (p. 212).

The teachers also believed strongly that they needed the trust of their students before they could contemplate trying new learning technologies. Dana, Elizabeth and Annabel all saw trust as something that had to be built slowly as a prerequisite to new practice. Annabel believed new practice could only be introduced "*once you are established*". Dana perceived "*a certain element of trust* [by her students] *that I am doing that because it is in your educational interest*". Elizabeth believed students responded positively, "*they would much rather you say, 'look I have thought about this and I am hoping it will work...can we give it a burl together?*" For Elizabeth, the relationship with her students often resolved the contradictions she experienced when introducing digital technologies into her classroom.
There was variation in the teachers' responses through the research. In particular, Annabel's practice was changed through what can be described as expansive transformation (Engestrom, 2001) and her professional identity changed. Elizabeth exhibited less technology self-efficacy but was willing to incorporate digital technologies into practice. Despite her superior self-efficacy, Dana's strong and seemingly traditional view of her teacher self, prevented her from changing practice to any degree.

Conclusion

This paper has been based on the story of a group of teachers confronting the challenge of integration digital technologies into classroom practice. From this story, a number of implications emerged to provide guidance for school leaders. It was clear from the data that teacher subjectivities dictated the extent to which teachers were prepared to make the necessary changes in their practice. For some of the teachers, barriers were created if the use of technology did not fit comfortably into their personal and professional identities. A comment to this effect came from Elizabeth, explaining her comfort with digital technologies at the beginning of the second phase of the research, "*That's not who I am*". Recognition of the central role of identity is vital if school leaders are to understand what motivates the teachers in their schools and ensures their willingness to change practice. Teachers must be seen as individuals with particular beliefs, knowledge and experience. School leaders should recognise and encourage teacher passion.

The view that being a good teacher in the 21st century involves the use of digital technologies (Ertmer & Ottenbreit-Leftwich, 2010) is difficult to refute. However, the data in this research made it clear that the teachers believed strongly that there was still a place for more traditional practice to co-exist with the newer pedagogies driven by digital technologies. Whilst some of the teachers may have described themselves as having limited technology self-efficacy, they also saw themselves as good teachers who had a positive impact on their students' learning. For this reason, school leaders must recognise and encourage classroom successes across a range of pedagogies, rather than assume that those teachers who do not adopt digital technologies are resistant to change. In addition, they should acknowledge that roadblocks may arise, such as negative experiences when digital technologies malfunction or when timely support is not available.

Certain conditions were revealed as facilitating changes in practice. In particular, the value of strong trust relationships was articulated through the data. Such trust, built over time, developed between the group of teachers and with their students during the second phase of the research through open sharing of success and failure. It is not sufficient for trust to exist within a silo such as the teacher group in the research; it should be part of the culture of a school. Students must feel that their teachers are trustworthy with their best interests at heart. Teachers must trust those in charge and believe that those in charge trust them and acknowledge and recognise their efforts. School leaders must communicate to teachers that they are valued as competent individuals who are capable of doing what is required.

New digital technologies will always be appearing on the education horizon. Teachers will continually be required to deal with these "*moving targets*" (Ertmer & Ottenbreit-Leftwich, 2010). School leaders and teachers must share a vision of how digital technologies are to be used as an effective tool for student learning in the ever-changing educational landscape. It is essential that the enactment of this vision is a collaborative effort that factors in the individual beliefs and experience of those involved.

References

Alsup, J. (2006). *Teacher identity discourses: Negotiating personal and professional spaces*. Mahwah, N.J.: Lawrence Erlbaum.

Arievitch, I. M. (2007). An Activity Theory perspective on educational technology and learning. In D. W. Kritt & L. T. Winegar (Eds.), *Education and technology: Critical perspectives, possible futures* (pp. 49-72). Plymouth, U.K.: Lexington Books.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117-148.

Beijaard, D., Meijer, P. C., & Verloop, N. (2004). Reconsidering research on teachers' professional identity. *Teaching and Teacher Education, 20*(2), 107128.

Blase, J., & Blase, J. (2001). *Empowering teachers: What successful principals do* (2nd. ed.). Thousand Oaks, Calif.: Corwin Press.

Bochner, A. P., & Ellis, C. (Eds.). (2002). *Ethnographically speaking: Autoethnography, literature and aesthetics*. Walnut Creek, CA: Altamira Press.

Bryk, A. S., & Schneider, B. (2002). *Trust in schools: A core resource for improvement*. New York: Russell Sage Foundation.

Chase, S. E. (2005). Narrative inquiry: multiple lenses, approaches, voices. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 651-679). Thousand Oaks, CA: Sage Publications.

Clandinin, D. J., & Connelly, F. M. (1996). Teachers' professional knowledge landscapes: Teacher stories - stories of teachers - school stories - stories of schools. *Educational Researcher, 25*(3), 24-30.

Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry: Experience and story in narrative research*. San Francisco: Jossey-Bass.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Crows Nest, N.S.W.: Allen & Unwin.

Day, C., Kington, A., Stobart, G., & Sammons, P. (2006). The personal and professional selves of teachers: Stable and unstable identities. *British Educational Research Journal, 32*(4), 601-616.

Dellinger, A. B., Bobbett, J. J., Olivier, D. F., & Ellett, C. D. (2008). Measuring teachers' self-efficacy beliefs: Development and use of the TEBS-self. *Teaching and Teacher Education, 24*(3), 751-766.

Engestrom, Y. (1999). Activity Theory and individual and social transformation. In Y. Engestrom, R. Miettinen & R.-L. Punamaki (Eds.), *Perspectives on Activity Theory* (pp. 19-38). Cambridge: Cambridge University Press

Engestrom, Y. (2001). Expansive learning at work: Toward an Activity-theoretical conceptualization. *Journal of Education and Work, 14*(1), 133-156.

Engestrom, Y. (2008). Weaving the texture of school change. *Journal of Educational Change, 9*(4), 379-383.

Engestrom, Y., & Miettinen, R. (1999). Introduction. In Y. Engestrom, R. Miettinen & R.-L. Punamaki (Eds.), *Perspectives on Activity Theory* (pp. 1-16). Cambridge: Cambridge University Press.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development (ETR&D), 53*(No. 4), 25-39.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 42*(3), 255-284.

Feldman, A., & Weiss, T. (2010). Understanding change in teachers' ways of being through collaborative action research: A cultural-historical Activity Theory analysis. *Educational Action Research, 18*(1), 29-55.

Finger, G., Russell, G., Jamieson-Proctor, R., & Russell, N. (2007). *Transforming learning with ICT: Making IT happen*. French's Forest, NSW: Pearson Education Australia.

Forcier, R. C., & Descy, D. E. (2005). *The computer as an educational tool: Productivity and problem solving*. Upper Saddle River, NJ: Pearson Education.

Friedman, I. A., & Kass, E. (2002). Teacher self-efficacy: A classroom-organization conceptualization. *Teaching and Teacher Education, 18*(6), 675-686.

Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479-507.

Goodson, I., Knobel, M., Lankshear, C., & Mangan, J. M. (2002). *Cyber spaces, social spaces: Culture clash in computerized classrooms*. London: Palgrave.

Grandin, R. G. (2006). *Following Vygotsky to a learner-centred school*. Teneriffe, Qld: Post Pressed.

Groundwater-Smith, S., Ewing, R., & Le Cornu, R. (2001). *Teaching: Challenges and dilemmas*. Southbank, Vic.: Nelson.

Hargreaves, A. (1994). *Changing teachers, changing times: Teachers' work and culture in the postmodern age*. London: Cassell.

Hargreaves, A. (2001). Emotional geographies of teachers' relations with colleagues. *International Journal of Educational Research, 35*(5), 503-527.

Hargreaves, A. (2005a). The emotions of teaching and educational change. In A. Hargreaves (Ed.), *Extending educational change* (pp. 278-295). Dordrecht, The Netherlands: Springer.

Hargreaves, A. (Ed.). (2005b). *Extending educational change: International handbook of educational change*. Dordrecht, The Netherlands: Springer.

Hargreaves, A., & Fink, D. (2006). *Sustainable leadership*. San Francisco: Jossey-Bass.

Hattie, J. (2003). *Teachers make a difference: What is the research evidence?* Paper presented at the Australian Council for Educational Research Annual Conference on Building Teacher Quality. Retrieved from http://research.acer.edu.au/research_conference_2003/4

Hoy, W., & Tschannen-Moran, M. (2003). The conceptualization and measurement of faculty trust in schools. In W. Hoy & C. Miskel (Eds.), *Studies in leading and organizing schools* (pp. 181-208). Greenwich, Conn: Information Age Publishing.

Kaptelinin, V. (1996). Activity Theory: Implications. In B. A. Nardi (Ed.), *Context and consciousness: Activity Theory and human-computer interaction* (pp. 103-116). Cambridge, Mass: MIT Press.

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with technology: Activity Theory and interaction design*. Cambridge, Mass.: The MIT Press.

Kaptelinin, V., Nardi, B. A., & Macauley, C. (1999). The Activity checklist: A tool for representing the "space" of context". *Interactions, 6*(4), 27-39.

Kelchtermans, G. (2005). Teachers' emotions in educational reforms: Self-understanding, vulnerable commitment and micropolitical literacy. *Teaching and Teacher Education, 21*(8), 995-1006.

Kuutti, K. (1996). Activity Theory as a potential framework for human-computer interaction research. In B. A. Nardi (Ed.), *Context and consciousness: Activity Theory and human-computer interaction* (pp. 17-44). Cambridge, MA: MIT Press.

Lave, J. (1988). *Cognition in practice: Mind, mathematics and culture in everyday life*. Cambridge: Cambridge University Press.

Louis, K. S. (2007). Trust and improvement in schools. *Journal of Educational Change, 8*, 1-24.

McCrindle, M. (2009). *The ABC of XYZ: Understanding the global generations*. Sydney: University of New South Wales Press.

Merrill, J. B. (2007). Stories of narrative: On social scientific uses of narrative in multiple disciplines. *Colorado Research in Linguistics, 20*(1), 1-25.

Murphy, E., & Rodriguez-Manzanares, M. A. (2008). Using Activity Theory and its principle of contradictions to guide research in educational technology. *Australasian Journal of Educational Technology, 24*(4), 442-457.

Nardi, B. A. (1996a). Activity Theory and human-computer interaction. In B. A. Nardi (Ed.), *Context and consciousness: Activity Theory and human-computer interaction* (pp. 7-16). Cambridge, Mass.: MIT Press.

Nardi, B. A. (1996b). Studying context: A comparison of Activity Theory, situated models and distributed cognition. In B. A. Nardi (Ed.), *Context and consciousness: Activity Theory and human-computer interaction* (pp. 69-102). Cambridge, Mass.: MIT Press.

Palmer, P. (2007). *The courage to teach: Exploring the inner landscape of a teacher's life* (10th anniversary ed.). San Francisco: John Wiley & Sons.

Peruski, L., Misra, P., Rosaen, C., & Koehler, M. (2007). *Boundary crossings: An activity theoretical analysis of technology diffusion in a teacher education program*. Paper presented at the Society for Information Technology & Teacher Education International Conference.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-6.

Reina, D. S., & Reina, M. L. (2006). *Trust and betrayal in the workplace: Building effective relationships in your organization*. San Francisco: Berrett-Koehler.

Riessman, C. K. (2008). *Narrative methods for the human sciences*. Los Angeles: Sage Publications.

Robertson, I. (2007). *E-learning practices: Exploring the potential of pedagogic space, Activity Theory and the pedagogic device*. Paper presented at the Learning and Socio-Cultural Theory: Exploring Modern Vygotskian Perspectives. International Workshop.

Robertson, I. (2008). *Sustainable E-learning, Activity Theory and professional development*. Paper presented at the Hello! Where are You in the Landscape of Educational Technology: ascilite 2008.

Russell, D. L., & Schneiderheinze, A. (2005). Understanding innovation in education using Activity Theory. *Educational Technology and Society, 8*(1), 38-53.

Ryle, A. (1999). Object relations theory and Activity Theory: A proposed lInk by way of the procedural sequence model. In Y. Engestrom, R. Miettinen & R.-L. Punamaki (Eds.), *Perspectives on Activity Theory* (pp. 407-418). Cambridge: Cambridge University Press.

Sannino, A. (2008). Sustaining a non-dominant activity in school: Only a utopia? *Journal of Educational Change, 9*(4), 329-338.

Sannino, A., & Nocon, H. (2008). Introduction: Activity Theory and school innovation. *Journal of Educational Change, 9*(4), 325-328.

Somekh, B. (2007). *Pedagogy and learning with ICT*. New York: Routledge.

Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 449-460): Springer Science + Business Media.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education, 23*, 944-956.

Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.

Witherell, C., & Noddings, N. (Eds.). (1991). *Stories lives tell: Narrative and dialogue in education*. New York: Teachers College Press.

Yates, L. (2005). *What can schools do?: Knowledge, social identities and the changing world*. Paper presented at the Inaugural Professorial Lecture, Melbourne University Faculty of Education Dean's Lecture Series 2005.

Zembylas, M. (2003). Interrogating "teacher identity": Emotion, resistance, and self-formation. *Educational Theory, 53*(1), 107-127.