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Teachers: technology, change and resistance

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Abstract

This chapter explores the way in which a culture of educational technology-related policy and curriculum change has arguably resulted in minimal improvement in teaching and learning. Moreover, it is argued that such a culture of change has instead simply increased teacher disengagement and thereby resulted in teachers being erroneously labelled by polichy actors, administrators and technology enthusiasts as 'resistant' to change, 'luddites' and 'risk averse'. Accordingly, this chapter challenges these simplistic labels, and offers a more critical perspective of how and why teachers (dis)engage with technology.

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Introduction

This chapter explores the way in which a culture of educational technology-related policy and curriculum change has arguably resulted in minimal improvement in teaching and learning. Moreover, it is argued that such a culture of change has instead simply increased teacher disengagement and thereby resulted in teachers being erroneously labelled, by policy actors, administrators and technology enthusiasts as 'resistant' to change, 'luddites' and 'risk averse'. Accordingly, this chapter challenges these simplistic labels, and offers a more critical perspective of how and why teachers (dis)engage with technology.

Critical questions

- Why is the use of digital technologies in teaching and learning believed to be important?
- What are some of the key reasons teachers' practice has not significantly changed as a result of increased digital technology access and use?
- What are some approaches schools and teachers can adopt to begin exploring new ways of teaching and learning through digital technologies?

The problem of technology-related change

For decades digital technologies have been heralded as great beacons of hope for new and improved teaching and learning. However, despite significant investment and policy initiatives, both in Australia and internationally, there has been little change in the fundamental practices or outcomes of schools, teaching, or learning. For instance, over the

past decade, there has been widespread installation of Interactive White Boards (IWBs) in classrooms largely supported by school-based initiatives, and an increasing number of one-to-one laptop and tablet programs supported by state and federal initiatives such as the Digital Education Revolution. These and other technology initiatives have exploded into schools but failed to revolutionise education or dramatically improve student learning.

Yet, it is important that young people are able to navigate, analyse and understand complex and changing landscapes of digital technologies and the data they mediate. Young people tend to use a lot of digital technologies, but they mostly engage in social networking and simple internet searches (e.g. Thompson, 2013). For students to develop sophisticated uses of digital technology, these uses need to be explicitly integrated into their learning. Moreover, research has shown that it is the change in processes of teaching using digital technologies that results in gains in learning; it is not so much the actual technology used.

For significant change to happen in schools, evidence has shown that teachers need to be able to take risks and experiment with how they design different learning tasks and classroom interactions. Through this process of exploration, they begin to figure out which digital technologies can support the learning they want to see in students. This chapter will provide readers with a critical view and better understanding of how and why teachers have, or have not, changed their practice and engaged with technology in teaching and learning. To do this, this chapter will describe some of the ways in which policy, curriculum and technology changes have affected teachers' responses to the use of digital technologies in classrooms. Essential to this discussion is to first consider what schools and teachers looked like in the past, what shapes and mediates teacher change, and how schools and teaching might change in the future.

A brief reflection on technology and change in schools

Teachers today are preparing students for future work and learning in the global knowledge economy. In fact, many of today's professionals are engaging in their work in ways that did not exist only a very short time ago. While it is commonly believed that teachers' work is falling behind in this area, how they work has actually changed quite dramatically. For example, teachers are now using electronic grading and attendance systems, as well as complex reporting databases. These tools provide new ways to explore student and school data to inform school policy and teaching practice. Teachers also engage in online professional learning, and share online resources within and beyond their schools, and even internationally. This has expanded their communities of practice and peer interactions to access a wider range of experience and gain feedback from more teachers. Communication among teachers and students has also shifted from only inside the classroom to spaces outside the classroom, such as educational social networking sites and learning management systems. This has provided new ways to provide students with feedback on their work, as they are developing assessments or completing assignments. As in any organization, many of these changes were introduced to increase teachers' efficiency and accountability in teachers' work. However, while teachers' administrative tasks, curriculum planning and professional learning are important, they are ancillary to the processes of 'teaching and learning'.

When society talks about digital technology and education, it has often been with the idea that new technologies will revolutionize education, and more specifically, that teaching and learning will fundamentally change for the better (see Chapter 13). Over the past century, this revolution has not happened. Cuban (1986) reports on this historical trend, from film (1910s) to radio (1920s) to television (1950s), wherein each of these technologies was expected to

revolutionise education. The technologies were encouraged in schools and made widely available, yet they resulted in limited and often superficial classroom use. Looking at television as an example, Cuban (1986) found that only about 2% of teachers were using television in their lessons. Furthermore, this usage was generally in the afternoon as a form of providing a break from normal class activities and hence, not meaningfully used for learning or integrated into the curriculum. Cuban highlights that there was no evidence to show learning with a TV was significantly better than other methods of instruction.

However, since 1990 international government investment in educational technology has continued to rapidly increase and, thus, access to technology in schools has also dramatically increased (Lim, Zhao, Tondeur, Chai, & Chin-Chung, 2013). Where one-to-one device programs have been implemented, increased use of digital technologies is evident, but teaching and learning has frequently remained fundamentally the same. With increased access to computers, tablets and the Internet, it has been widely believed that students will move from passive consumers of information to creative producers and active constructors of new knowledge and understanding; another revolution is expected. These kinds of practices are broadly referred to as *student-centred*. Increasingly it is believed that student-centred practices are the most effective way to integrate digital technologies in the classroom (see Ertmer &Ottenbreit-Leftwich, 2010). An example of digital technology use, but without fundamental change, is direct teaching using an interactive whiteboard. Teachers may use an interactive white board to teach, but they are often still ‘delivering’ content to students in much the same way as they did with an old blackboard. While teachers are able to write over and annotate texts and webpages, this is not fundamentally different to what was done in the past using overhead projector transparencies or photocopies. This example demonstrates that, in terms of pedagogy, teachers have for the most part integrated technologies into existing

practices rather than changing their practice. There are also teachers using digital technologies in highly innovative and creative ways, but these have been the exception.

The point is that, internationally, the general consensus is that the significant government investment in digital technologies has not resulted in the expected educational revolution. In many cases teachers have been blamed for this problem. Teachers have been branded as resistant to technology, luddites and risk-averse. Digital technologies were seen as the future of education, and teachers were seen as at fault for the lack of success.

Nonetheless, there is an increasing awareness that better support including professional learning opportunities are critically needed to help teachers change. Increased understanding of the support needed for teachers to change their practice is essential, but there are also other issues contributing to the perceived failure. The following sections will explore the concept of change in schools and some of the key factors impacting on teachers' integration of digital technologies into the classroom and their practices.

What is change?

Understanding educational change is key for teachers, as engagement with different digital technologies and change will be expected over the course of a career. Change is generally considered to be the act of becoming something different. Educational change is commonly used to describe *educational reform*, which is the goal of changing public education in some way. In this discussion, the term *educational change* will be used. Educational change happens at a variety of levels: student, teacher, school, local community, state and nation (Fullan, 2007). The aim of changing education to incorporate more digital technologies in

learning has been a particular goal for over a century, but it has increased in importance since the widespread introduction of computers in the 1980s.

It is difficult to say if the volume of change initiatives in education has dramatically increased over the past few decades, but it is possible to say that there have been continuous efforts to 'fix' teaching and learning. Integrating digital technology in learning is only one type of educational change. There are also significant foci on literacy, numeracy, improving performance of disadvantaged students, just to name a few. However, one of the more recent influential changes has been increased international emphasis on standardized testing and accountability in student learning.

In his examination of educational change, Hargreaves (2009) explained that since the 1990s education has increased its focus on creating closely prescribed curriculum and standards, which has also resulted in increased high-stakes testing to measure student performance on these standards. He explains that schools' collective performance on tests have then been used to publically gauge school performance and allocate funding. The pressure on schools and teachers to perform well on these tests is intense. Focus on testing, in some contexts, leaves less instructional time for other subject areas or tasks that are not directly related to the test. This provides a key element of school context to begin unpacking use of digital technologies and understanding change in teachers' practice.

Change and schools

In the last two decades the global technology investment in schools has increased by more than a hundredfold (Lim et al., 2013). The result of investment has been great availability of digital technologies, such as laptops, computers and tablets, in schools. Consequently, there

has been an increase in *use* of these tools in teaching and learning. It is quite common to see a wide array of digital technologies in schools. In teaching and learning these tools have largely been used to replicate existing teaching practices. Moreover, in many cases it has been found that technologies are not being used effectively or in ways that allow students to explore, problem-solve, create and collaborate (see Ermter & Ottenbreit-Leftwich, 2010).

Three key factors

Three key factors relating to the school have been shown to significantly affect teachers' use of digital technologies and change in teaching and learning: 1) leadership, 2) shared group vision and 3) technical and pedagogical support. The first factor, leadership, relates to the school principal. Research has shown that how a principal prioritizes digital technologies was the strongest contributing factor to teachers' use and related student-centred pedagogy (see Law, Pelgrum & Plomp, 2008). An important component of this is a clear vision outlining how digital technologies are expected to be used, such as students will engage in critical analysis of texts in each subject area. Teachers should participate in creating this vision, which leads to the second key point. By participating creation of a 'shared vision,' teachers are more likely to feel invested in technology use and change, which it creates a school culture of change. Change becomes a community activity.

As part of this process, leading to the third point, the principal would also provide the necessary support structures for change to occur. This includes both technological support for learning about and using digital technologies, as well as pedagogical support for developing and experimenting with using technologies in teaching and incorporating student-centred practices. Through these three components it is communicated to teachers that use of digital technologies and change is valued in the school.

However, all three of these components have systematically been lacking in many, if not most, technology-related school change initiatives (Hargreaves & Shirley, 2009). Often this is not on purpose, but rather a result of competing school change initiatives, lack of time and funding to fully support different programs. For example, as discussed earlier, there has been significant pressure put on schools to perform well on standardized tests. These tests tend to focus on literacy and numeracy, so reading and mathematics skills. A principal may value use of digital technologies, but they may need to ask teachers to focus their time on literacy tasks and target reading programs, rather than developing teaching resources to better integrate technologies.

Another possibility is that a principal may not know digital technologies can be used most effectively in different areas of teaching, so they let the teachers decide for themselves. This provides teachers with the opportunity to create their own shared vision, but more often results in teachers doing what they know will reliably support student learning. However, there is general consensus that the most critical agents in facilitating educational change are teachers, and therefore, it is essential for teachers to consider how they learn and how schools can support that process.

Change and teachers

The decision to use technology for instruction rests on the classroom teacher. Educational technologists have long suggested that use of digital technologies is more likely to lead to enhanced learning outcomes and student achievement when combined with student-centred practices (e.g. Ertmer, 2010; Lim et al., 2013), but it is often uncertain which practices or digital technologies produce these results. This uncertainty has been a significant factor in teachers' adoption of digital technologies in their practice.

While some teachers are likely to incorporate digital technologies in their practice, many will not. Of those that do, the approach to teaching with technology use will widely vary. There are three key factors influencing teachers' decisions about integration. The first is their school culture. The next two are confidence using technology and beliefs about technology in teaching, which have to do with the individual teacher.

One result of ongoing educational change is that teachers have become disengaged with school change initiatives. Considering the three broad school factors outlined in the previous section, possible reasons can be considered: 1) lack of leadership prioritizing the change, 2) shared vision not developed and 3) technical or pedagogical support to fully engage in the change is not provided. Failure to adequately address and support change communicates to teachers that the change is not valued and not a school priority. The connection between what is valued at the school level and what teachers value is critical. Teachers are more likely to value and feel digital technologies are of benefit in teaching and learning, if these beliefs are supported and reinforced by their peers and the school (Zhao & Frank, 2003). The same goes for using student-centred teaching practices. If the school does not value this approach, teachers are less likely to incorporate it in their practice.

Individual factors

The other two significant factors are confidence using technology, and teachers' beliefs about technology and teaching. On the first point, teachers who are more confident using technology are more likely to integrate technology in the classroom. In fact, researchers have identified that the most important factor in teachers' use of technology is confidence (see Inan & Lowther, 2010). However, it is not only that they feel confident using digital technologies;

they also hold the belief that they can troubleshoot and problem-solve issues that may arise from unreliable tools or technical glitches. Conversely, teachers who feel anxious about using digital technologies and are uncertain about their ability to effectively teach with it are less likely to use it in their practice. This anxiety often results from feeling they will not be able to fix technical issues while teaching. Teachers with less confidence using digital technologies will perceive greater risks and negative effects on learning resulting from technical issues and problems than teachers feeling more confident (see Howard, 2013).

Integration is also influenced by beliefs about digital technologies and teaching; these are not necessarily related or the same thing. Teachers likely to integrate digital technologies in their practice are likely to believe 1) they are relevant to their specific area of teaching and learning and 2) use of the digital technology aligns with the aims and goals of their teaching. As such, a good portion of use will be replicating existing valued practices, which can be done more efficiently through a technology. The interactive whiteboard is a good example of this. Using this tool teachers are still presenting content to students, so it matches a valued and reliable teaching practice. However, the device also provides easy access to a wide range of supporting multimedia tools, without having to go between a computer and whiteboard, so it is useful and relevant. Research has shown that teachers who are likely to integrate digital technologies are also more likely to use more student-centred approaches (see Ertmer & Ottenbreit-Leftwich, 2010).

Change and taking risks

Having looked at a few key aspects of change in schools and with teachers, it is possible to begin unpacking why teachers may seem resistant to using digital technologies and change, and what this means for schools. To do this, it is necessary to think about what teachers are

putting at risk when they are asked to do new things. First, regarding use of digital technologies, teachers feeling less confident may feel embarrassed about having problems such as not understanding computer errors, being unable to access a file or web pages not loading. Small problems such as this can make teachers feel out of control and that their professional competence is being compromised. As digital technologies become more and more familiar with students and colleagues, some teachers may even feel ashamed that they are not confident using new devices or resources. Time off task in the classroom trying to fix problems can result in students becoming disengaged and disruptive. Teachers may feel time taken from instruction will have negative effects on learning. Of course these concerns may seem like excuses or justifications for not using digital technologies and being resistant. Regardless, these are concerns that need to be addressed.

This then leads to the second issue. Teachers are more likely to adopt digital technologies and new practices that align with learning aims and goals. Many digital technologies present new ways to teach and learn which are unknown, the benefits to learning may be unknown or are not significantly greater than a non-digital approach. If the benefit to work or learning is unknown or not greater then it may be difficult for some teachers to justify the cost of time spent learning about digital technologies, planning for teaching and potential issues in the classroom. Further, without clear expectations for use and if not valued in the school, then there is little reason for teachers to take the risk, particularly if they are not confident. These concerns are compounded when pressures are put on teachers to insure students perform on standardized tests. If teachers feel they are under threat their teaching will become more constrained and less flexible (Olsen & Sexton, 2008), therefore will be less likely to take risks, experiment with new approaches in the classroom and change.

However, to change, it is necessary to take risks. Some individuals will find change less risky, while others perceive higher risks for the same thing. Studies have found that teachers having an 'openness to change' are more likely to experiment and integrate digital practices in the classroom and believe that student learning is enhanced through the use of these tools (Baylor & Richie, 2002). While some technologists have attributed risk-taking and an openness to change as a personal trait, sociological perspectives have demonstrated that these can be fostered at a cultural level to support individuals to engage in change.

Risk taking is something schools can encouraged through fostering experimentation and a culture of change. A culture of change means that teachers can work towards change and feel they are able to experiment with new tools, approaches and teaching strategies without punishment or fears of negative impact on students' learning (Little, 1982). After all, it is unlikely that experimenting in a few lessons is likely to negatively affect students overall learning.

School leadership should identify and limit perceived threats to teaching and learning where possible. They can do this by involving teachers in the decision making processes about technology-related change and the school's vision for integration, discuss how it is expected to be used in the classroom and provide appropriate technological and pedagogical support. A key element of this support is also providing teachers with the time to learn about new tools, plan, collaborate and develop new curriculum. This type of environment reduces concerns about failure, punishment and compromising professional standing.

By providing support, and a developing a shared vision of integration, a collective positive belief about and value of digital technologies and change can be created. The process of

change can become a collective school effort. This is important, for two reasons. First, it supports teachers who feel anxious or uncertain and find change difficult. Also, because the opinions of colleagues matter to teachers, teachers who are actually resistant to using digital technologies are more likely to adopt the values of their colleagues (Zhao & Frank, 2003).

Concluding comments

As we consider the future of technology integration, the one certainty is that it will continue to change and teachers will continually be asked to experiment with new digital technologies and teaching strategies. It is important to understand that some teachers are more open to change and risk-taking, while others many will be more cautious and have more concerns. By keeping in mind that teachers' concerns may have legitimate grounding in professional competence, risks to student learning or lack of support to productively engage in experimentation and change strategies to address these issues can be identified.

Moving forward and thinking about how technology-related change is supported, the community of peers and knowledge teachers can access is expanding. While the support and culture in the school is essential, teachers can now participate in wider online and blended (online and offline) communities of practice (see Chapter 26). Teachers already tap into a wide range of online teaching and learning resources. They are increasingly engaging in formal online training and informal collaborative groups in social networking spaces. For example, teachers can participate in TeachMeets, which are a blended type of professional development. Informal groups meet face-to-face to give short presentations and discuss best practices. Teachers can also participate online through social networking, called a 'back-channel.'

Ultimately, integrating new digital technologies to support learning requires teachers to take risks and to change. Moving forward with change requires support from schools and a *culture* of change, but also time and effort from individual teachers. Both are necessary for educational change to be successful. In regard to use of digital technologies, schools need to attend to uncertainties and concerns about use in teaching and learning, and provide support. Teachers need to be aware of how open they are to experimenting and engaging with different tools and teaching strategies, where appropriate. Most importantly, teachers need to work with peers, their schools and the wider teaching community to support the change process.

Exploring

Describe an example of a teacher using a technology in class. Debate whether it is being used in a way that is fundamentally different to how it could have been done before.

Further reading

Popham, J. (2001). Teaching to the test. *Educational Leadership, 58*(6), 16–20.

This reading explains 'teaching to the test' and implications for learning.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge: Harvard University Press.

This book addresses contexts affecting how teachers use technical innovations and popular beliefs about how it is thought to enhance learning.

Websites

Scootle Community

https://www.scootle.edu.au/ec/p/home

This is a national professional learning network for all Australian educators.

TeachMeet

http://en.wikipedia.org/wiki/TeachMeet

TeachMeets are an informal online and offline gathering of teachers to discuss innovation and technology. They represent a blended approach to a community of practice.

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Olsen, B., & Sexton, D. (2008). Threat rigidity, school reform, and how teachers view their work inside current education policy contexts. *American Educational Research Journal*, 46(1), 9–44. doi:10.3102/0002831208320573

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