Chapter 3
Technological Infrastructure and Implementation Environments:
The Case of Laptops for New Zealand Teachers

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ABSTRACT

The integration of ICT is the apparent goal of range of educational initiatives worldwide. To date, however, the impact of ICTs has lagged behind the rhetoric. Rather than technology transforming teaching and learning it appears that teachers often assimilate it into existing practices. This chapter uses Douglas Engelbart's (1992) notion of an improvement infrastructure to explore and explain the factors that have framed and shaped New Zealand teacher access to, adoption of, and resistance to the use of laptops. Engelbart posits that organizations should aspire to creating three levels of infrastructure for improvement: a core capability infrastructure, an infrastructure that enables the improvement of core work, and an infrastructure that enables the on-going improvement of the improvement processes. Improvement of improvement typically receives the least long-term strategic investment. For teachers with laptops improvement of improvement is what enables teachers to enhance their ability to use their laptop. In this chapter we show that this involves the system of teacher confidence and expertise, teacher professional development opportunities, teacher access to a reliable technological infrastructure, and the existence of a supportive school leadership and culture for ICT/laptop use.

INTRODUCTION

The integration of ICT is the apparent goal of an extensive array of educational initiatives world-wide. One of the rationales appears to be to prepare children to take an active part in an increasingly complex and information rich world. Also evident is the view that ICT can enhance student learning within the current curriculum through a positive impact on student attitude to and approaches toward learning. To date however the impact of ICT technologies on education and schools has lagged behind the rhetoric. Rather than the technology transforming teaching and learning it appears that teachers often assimilate ICTs, including computer use, into existing classroom practices (Cuban, 2001). Selwyn (1999) argues that this is because computers have been 'inserted' into schools with very little consideration of teacher perspectives and the realities of classrooms. In this chapter we explore the personal and contextual factors that have framed and shaped New Zealand teacher access, adoption and resistance to the use of laptops provided for their personal use as part of a government initiative to foster teacher professional use of ICT. To do this we draw on Engelbart's (1992) notion of an improvement infrastructure and improvement community. Engelbart posits that organizations should aspire to creating three basic levels of infrastructure: a core capability infrastructure (this is what is needed to enable people to do the core work of the organization); an infrastructure that enables the improvement of core work, and an infrastructure that enables the on-going improvement of the improvement processes. He asserts that the third level is ultimately the most important to organizational effectiveness because it involves 'getting better at getting better'. He also notes that the improvement-of-improvement level typically receives the least long-term strategic investment.

FRAMING THE CONTEXT OF TEACHER ICT USE

It is now generally agreed that teacher computer use is shaped by a meld of personal and contextual factors (Owston, 2007). Teachers who are confident and competent in using ICT not only appreciate its usefulness but can also envisage possible benefits for their students (Jones, 2004). However, teacher response to innovation is never sequential, predictable or even able to be generalized (Windschilt & Sahl, 2002). ICT use is not just based on the individual being able to 'understand' the potential benefits of ICT use, but also on how well ICT-based activity 'fits' with the wider contexts within which they are operating (Selwyn & Facer, 2007). Thus, school-level factors influence teacher utilization of ICT. Zhao and colleagues (Zhao & Frank, 2003; Zhao, Pugh, Sheldon & Byers, 2002) provide evidence that, when the prevailing school culture is one of collaboration and mutual support for change, the diffusion of technology innovations is more likely. Strong school leadership, including a vision for change and planning for action to implement this vision, are crucial in any successful educational change initiative (Fullan, 2001), and all the more so in change that involves technology because this can lead to changes in school structures and systems and the teaching and learning process (Cuban, Kilpatrick & Peck, 2001). It is important that school principals work to share their goals and develop others as leaders within a school (Anderson & Dexter, 2000).

Teacher use of ICT, particularly any integrated classroom use, requires a reliable technological infrastructure that includes network systems, hardware and software (Cox, Preston & Cox, 1999). Teachers need easy access to a range of ICT resources if they are to make effective use of these in the classroom. Quality on-site technical support is important so that teachers can be confident that ICT equipment will be functional when they need it (Jones, 2004; Zhao *et al.*, 2002).

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