Chapter 72
Going 1:1 with Laptop Computers in an Independent, Co-Educational Middle and High School

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ABSTRACT

This chapter describes some of the findings from a QUAL + QUAN concurrent mixed method study that examined the first-year implementation of a one-to-one (1:1) laptop initiative in a suburban, independent, co-educational middle and high school in the United States. Overall, the 1:1 laptop implementation was viewed as a positive learning experience for students, teachers, staff, and the school administration. Nevertheless, several problems developed over the course of implementation. These were: technical problems, issues with student distraction and off-task behavior, inappropriate uses of technology, as well as challenges to pedagogical and classroom management, and inclusion of teachers' voices in implementation decisions. They are introduced in addition to several possible solutions. The chapter closes with suggestions for future research, such as the need to research 2:1 and 3:1 mobile technology initiatives, which are sure to become a part of the 21st century teaching and learning landscape.

INTRODUCTION

By definition, "1:1 laptop or computing initiatives" refer to a "robust access ratio of one computer to one student" (Bebell & O'Dwyer, 2010, p. 6). The implicit goal is that this kind of initiative will provide optimal conditions for technology-immersed teaching and learning. Advocates suggest that for technology to make a powerful difference in student learning, students must be able to use computers more than once or twice a week in a lab or at school (Kozma, 1991). Limited access is often cited as a reason why teachers refrain from using technology as much. Ubiquitous use

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of computers makes it possible for students and teachers in schools to transition from occasional, supplemental use of computers for instruction, to more frequent use of technology allowing access to a wider array of resources, support of student-centered learning, and increased communication and technological literacy (Penuel, 2006). According to Penuel (2006), decreasing costs, lightweight laptops, and the growing availability of wireless connectivity, all combine to make one-to-one (1:1) initiatives feasible on a broader scale in schools.

Expanding rapidly across the United States, these 1:1 large-scale state or district led initiatives are spreading across many states such as Maine, Virginia, Louisiana, Texas, Florida, New Hampshire, and California (NSW Report, 2009). Despite lingering uncertainty over the effectiveness of such programs, the prevailing belief that *ubiquitous* access and use of computers among teachers and students can potentially lead to an improved "teaching-learning process" (Moses, Khambari, & Luan, 2008, p. 104) has resulted in substantial and prolific investment in 1:1 programs (Bebell & O'Dwyer, 2010; Holcomb, 2009; Mouza, 2008; Weston & Bain, 2010). Many of these initiatives were facilitated, at first, through corporate-sponsored programs like Microsoft's Anytime Anywhere, Apple's 1:1 Learning, or Apple Classrooms of Tomorrow™ (Dunleavy, Dexter, & Heinecke, 2007; Foote, 2008; NSW Report, 2009). However, more and more, schools across the US are funding 1:1 initiatives on their own.

The International Society for Technology in Education (ISTE, 2009) defines the optimal conditions for implementation of technological innovations in education in terms of shared vision, empowered leaders, implementation planning, consistent and adequate funding, equitable access, skilled personnel, ongoing professional learning, technical support, curriculum framework, student-centered learning, assessment and evaluation, engaged communities, support policies, and supportive external context. These conditions suggest a vision wherein the context of schooling is highly influential on the impact of technological innovations within educational reform. Therefore, as schools, districts, or states weigh the cost-to-benefit ratio of laptop initiatives, evidence from research on teaching and learning outcomes of 1:1 laptop initiatives and the necessary conditions for implementation should guide the adoption of such innovations, which, therefore, makes it imperative to expand and deepen research within this area.

Penuel (2006) draws on two theoretical perspectives to help guide future research: a) theories of what kinds of learning outcomes are possible with wireless laptop computers, and b) theories of implementation of technological innovations in the classroom. Within this perspective, most research on 1:1 initiatives focuses on learning outcomes, not just with respect to students, but also with regards to teachers using laptop technology in their classrooms (Hillarious & Milman, 2012).

Prior research indicates that ubiquitous access to computers makes it possible for teachers and students to build technology literacy skills, to access and use a large array of resources, to communicate, collaborate, and interact with each other in increasingly constructivist learning and teaching environments (Bebell & O'Dwyer, 2010; Penuel, 2006). Additionally, laptop use points to students spending more time on project-based instruction, greater writing (which is also frequently of higher quality), improved research analysis skills, problem solving and critical thinking skills, and deeper, more flexible uses of technology. Additionally, other benefits include increased student achievement (Dunleavy & Heinecke, 2008; Gulek & Demirtas, 2005), student engagement, motivation to work independently, and class participation and interaction with others (Holcomb, 2009; Penuel, 2006). Likewise, the literature also suggests that laptop use results in more confident and empowered teachers, and teachers who generally spend less time lecturing (Holcomb, 2009; Moses, Khambari, & Luan, 2008) and more time

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