Chapter 4

Using the XO Laptop to Build a Digital Bridge Between Primary Schools and Universities

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ABSTRACT

One-to-one computing has emerged as a controversial framework for integrating technology in education. The Cambridge Friends School XO laptop pilot program is a collaboration between the Digital Literacy Project (DigiLit), a non-profit and Harvard College student organization, and the Cambridge Friends School (CFS), an independent K-8 school. This chapter will examine both positive and negative features of the program, as well as a model for implementation of similar programs. DigiLit introduced low-cost XO laptops to two grade levels and designed laptop-based lesson plans. The author also investigated the XO’s effects on collaborative behavior, finding that laptops influenced mobility and sharing of information during group activities. As part of the pilot, students tested new software and completed a survey about the design of an open-source spreadsheet program. The partnership between DigiLit and CFS has provided a platform for researching child-computer interaction and for developing a laptop-based curriculum.

INTRODUCTION

One-to-one computing refers to a classroom setup in which there is one handheld device (i.e., computer, laptop, PDA) per student or teacher. This movement hails from the early stages of digital technology in education. In 1985, Apple implemented the first large-scale K-12 one-to-one computing program through the Apple Classrooms of Tomorrow (ACOT) initiative. More recently, in 1997, Microsoft introduced Anytime Anywhere Learning (AAL), which provided laptops for teachers and students. These and other ubiquitous computing programs have ushered in an era in which technology is readily accessible in schools.
Since the 1980s, the meaning of one computer to one student or teacher has changed dramatically, as laptops have replaced desktops and wireless Internet has become a feature of many American classrooms. Low-cost computing is a recent phenomenon sparked by the XO, a $200 laptop designed by the nonprofit organization One Laptop per Child (OLPC). This child-friendly laptop has spurred on a new market for low-cost laptops, including Intel’s Classmate and Asus’ Eee, which also retail for around $200.

Despite the recent drop in costs associated with one-to-one computing, these programs have remained controversial due to conflicting reports on their classroom impact. A number of studies suggest that one laptop per student can enhance 21st Century skills and improve writing ability (Penuel, 2006). However, these and other studies have found that the success of these programs is highly dependent on support for teachers, who act as “gatekeepers” to educational change (Cuban, 2004, p. 106). Integration of computers into existing curricula is a gradual process that depends on teacher comfort with technology in the classroom (Sandholtz, Ringstaff, & Dwyer, 1997). The challenging nature of this process is underscored by findings showing that most teachers in one-to-one classrooms are still adapting course material to laptop computers (Penuel, 2006). While today’s children are digital natives, or “‘native speakers’ of the digital language of computers, video games and the Internet,” teachers are digital immigrants, “who speak an outdated language (that of the pre-digital age) [and] are struggling to teach a population that speaks an entirely new language” (Prensky, 2001).

We will explore a collaborative model for one-to-one computing program initiation that includes nonprofit and student organizations at universities. This case study will look at how university students can partner with primary schools to facilitate laptop integration through technical support, teacher training, and curriculum development. We will investigate the use of the low-cost XO laptop for this type of initiative, specifically exploring its effects on collaborative behavior and how its open-source software can be tailored to children through a user-centered design approach.

**BACKGROUND**

**The Low-Cost XO Laptop**

One Laptop per Child’s XO (Figure 1) is a low-cost, environmentally friendly children’s laptop. In an effort to bridge the digital divide, over 1.4 million XO laptops have been distributed to children in over thirty countries around the globe (One Laptop per Child, 2009). Specifically designed for the developing world, the XO is energy efficient and durable, allowing it to withstand high temperatures and exposure to water. It also boasts a rotating screen that allows configurations for e-book reading and gaming, as well as standard laptop use. In addition, the XO is the only laptop with wireless mesh network technology that allows offline peer-to-peer communication.

Even though the XO was designed with the developing world in mind, its low cost and effective, child-friendly software give it potential to positively impact the American educational landscape. According to data released by the U.S. Census Bureau in 2009, there was an average of 3.9 students per computer in public and private schools during the 2005-2006 school year. Although American students have access to computing resources at school, many are still not able to take ownership of computers by having their own laptops that they can use at school and at home.

**History of the Digital Literacy Project**

While the XO laptop has tremendous potential in the classroom, the current lack of teacher and student support limits students’ ability to use this technology as a gateway to the world. After learning about the One Laptop per Child project,
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