Chapter 1.13
Anywhere, Anytime Learning Using Highly Mobile Devices

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INTRODUCTION

In a world that is increasingly mobile and connected, the nature of information resources is changing. The new information is networked, unlimited, fluid, multimodal, and overwhelming in quantity. Digital technologies, such as mobile phones, wireless handheld devices, and the Internet, provide access to a wide range of resources and tools, anywhere and anytime. This type of access and connectivity has also had an impact on how we collaborate on projects and share media and therefore, greatly increases opportunities to learn inside *and* outside institutionalized school systems. Learners now have the tools to take learning beyond classrooms and the school day.

The development of handheld devices can be traced back to Alan Kay's vision of the Dynabook. As early as the 1970s, Kay envisioned a mobile, kid-friendly, notebook-sized computer with artificial-intelligence capabilities that would support children's learning inside and outside of school. Similar ideas soon followed in the form of devices such as the Psion I (1984), the GRiDPaD (1988), Amstrad's PenPad, and Tandy's Zoomer (1993), the Apple Newton (1993-1995), and the eMate (1997-1998). During the 1990s and early 2000s, Palm developed a series of handheld devices that defined the handheld market in North America, while Microsoft developed several versions of its Windows Mobile software that could be found

on mobile devices made by such companies as HP, Dell, and more recently, Fujitsu Siemens (Bayus, Jain, & Rao, 1997; HPC Factor, 2004; Williams, 2004).

There are also many devices whose primary function is entertainment or communication, including media players such as Apple iPods, portable gaming devices like the Sony PSP and the Nintendo DS, and, of course, mobile phones. These types of devices are becoming increasingly popular and multifunctional, with iPods being able to store and play music, pictures, and video; portable gaming devices sporting wireless capabilities for interaction between devices (and in the case of the PSP, Internet access); and mobile phones being used to shoot pictures and video, upload content to the Web or e-mail it elsewhere, do text messaging, and make phone calls. Whatever the device, convergence seems to be increasingly important, and growing numbers of young people are using these mobile, digital, and connected tools daily, whenever and wherever they need them, and this includes schools.

BACKGROUND

Mobile computing enthusiasts have advocated the use of highly mobile devices for teaching and learning to get closer to a ubiquitous computing environment, defined in 1991 by Mark Weiser as a setting in which "a new way of thinking about computers in the world … allows the computers themselves to vanish into the background" and become indistinguishable from everyday life (p. 94). Weiser emphasized that ubiquitous computing does not just mean portability, mobility, and instant connectivity, but also the existence of an environment in which people use many computing devices of varying sizes that interact with each other, combined with a change in human psychology, to the point where users have learned to use the technology well enough that they are no longer consciously aware of its presence and do not have to be. This version of ubiquitous computing has recently been revisited by scholars such as Yvonne Rogers (2006), who proposes a modified version in which

UbiComp technologies are designed not to do things for people but to engage them more actively in what they currently do (p. 418);

and Bell and Dourish (2007), who argue that ubiquitous computing is characterized by power-geometries (the ways in which spatial arrangements, access, and mobility reflect hierarchies of power and control); heterogeneity (as opposed to standardization and consistency in technology, use, and regulation); and management of ubiquitous computing that is messy.

Weiser's somewhat revised vision of ubiquitous computing fits well with current visions of technology integration in education and its potential impact on teaching and learning. Academic research has shown that computer use and student learning gains are "closely associated with having computers accessible to all students in teachers' own classrooms" (Becker, Ravitz, & Wong, 1999; see also Shin, Norris, & Soloway, 2007). Highly mobile devices provide a solution because of their small size and comparatively low cost in acquisition and ownership (Norris & Soloway, 2004; Sharples, 2000a), and they supplement the existing technology infrastructure. Some scholars have defined the resulting learning environment as "handheld-centric," "providing all students with access to valuable resources on a shared but timely basis," where each tool has been earmarked for its intended use (Norris & Soloway, 2004; Tatar, Roschelle, Vahey, & Penuel, 2003). Another group of scholars is looking at learning with highly mobile devices from a broader perspective. They have coined the term m-learning, "the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies" (Sharples, Taylor, & Vavoula, 2007).