

## Wireless: Changing Teaching and Learning “Everywhere, Everytime”

On a beautiful fall day, Maria Jones walked onto campus carrying her usual “stuff.” Stacked in with a book, a clipboard, and a magazine was Maria’s 7.5-by-9-inch “minibook” computer, buzzing merrily away. Rather than buzzing as the result of a reminder that Maria had set earlier, her computer was buzzing because she had come into proximity of and triggered another computer about one hundred feet away, which then sent information about her courses for the day to her minibook. Reaching into the stack, Maria took out the minibook and looked at the exposed flat screen. She noticed that one of her classmates had sent the charts for a class presentation later that day. “Whoops, something wrong here,” she thought, looking for a convenient bench nearby. Maria sat down and cantilevered the screen upward to reveal a full keyboard underneath, which automatically slid open to full size. She tapped the “respond” icon on the screen, typed in a message, used her pen to circle the error on the graph, and tapped the “send” icon. A clear chime rang, not from the belltower of the quadrangle but from her minibook. She closed the mini, yelled at Ira to wait up, and started yet another normal day. Although Maria didn’t really care about or understand the technology involved, she was deep in the next evolution of technology use for learning.

Some of us might marvel at the minibook with its cantilevered screen and expanding keyboard, but the real evolution in the future scenario above is not the computer but the automatic communication that occurred. Wireless

technology—that dream of the “anywhere, anytime” enabler of learning—has started to arrive on the teaching and learning scene. Already we’re hearing of “wireless” campuses in the same way we heard of “wired” campuses several years ago. While some higher education institutions are moving forward to develop a completely wireless campus, others are taking a test-by-test, pilot expansion model. Still others are starting to realize that though they may not have been able to catch the wired campus wave, they can leapfrog and even save money by developing a mixed mode of wired and wireless. But rather than focus on the tech of the technology, let’s look at the possible implications that wireless might have for teaching and learning:

- Better realization of “anywhere, anytime”
- Freedom of organization in and out of the classroom
- Collaboration among students separated geographically
- Transparent connection to nets
- Remote sensing and integration of information
- Shift from “anywhere, anytime” to “everywhere, everytime”

Today we can see these implications reflected in early wireless pilots. Probably the most intriguing use of wireless is not in whole building implementations but in “wireless à la cart.” In such uses, a rolling cabinet with twenty or so portable computers and a wireless bridge are rolled into a seminar or classroom, and the bridge is plugged in to the lone Internet connection in the room. The portables

are detached from the built-in chargers and are used throughout the room by students in teams of two or three. As easy as opening the cover to the computers, students are connected with the local network file system and at the end of the class can copy work to their file space for later use.

The most visible of these types of connection is Apple’s iBook and AirPort. Comments from professors like Andrew Lumpe of Southern Illinois University say it best: “The first semester we brought the classrooms online, we noticed that the students started using them like crazy.” Lumpe highlighted the enthusiasm and the efficiency gains: “They’d be in there before class, after class, between class . . . they were all coming over to the lab just to use the machines, for all kinds of work related to their program. It was really exciting and invigorating to the faculty teaching in these rooms, because we all saw the immediate benefits. The productivity just went sky-high!” Lumpe added, “The AirPort hub stays in the computer lab, and all of the iBooks have wireless cards.” He noted: “Now the faculty just come by, grab the cart, and run down the hallway to their classroom, and their students can instantly be on the Web. The teachers don’t even have to move the AirPort hub if they’re close by. If they’re in a room that’s farther away, it’s really easy to unplug the base station and reconnect it in the new room. There’s no need to change IP addresses, or do anything.”<sup>1</sup>

There’s no doubt that a subtle evolution has started. Striking a similar but perhaps transitional note from current to

future, Gary Kornblith, professor of history at Oberlin College, uses an analogous idea in his history course on the industrial revolution in America. “A traditional computer lab is not conducive to pedagogy,” says Kornblith. “In this room, we use the iBooks just like textbooks—they are *part* of the class, not the focus of the class. We can open and close them easily, without disrupting the flow of the lecture.” Kornblith cites the wireless feature, which allows for movement, group collaboration, and comfort. Kornblith’s colleague Anne Trubek uses the

the reason these students thought the portables weren’t working was the automatic Internet connection and the speed of downloaded pages. They thought that the portables must have been using cached pages. However, students with little computer experience and with no expectations regarding connection and download speeds thought that the portables were “just fine.” The seamless connection and reasonable Internet speeds mean that the transparency of student use of technology increases; it follows, then, that time

Packet Design, discussed the term “duty cycle” as a concept we need to use in higher education. She mentioned an example in airline maintenance: a part is often replaced before its failure, with replacement time based on a statistical determination of the expected life of the part. Applying that concept to campus administration using wireless, we can envision that in the future, students will depend on the “duty cycle” of assignments, financial commitments, and even progress toward a degree to inform them of needed action before deadlines and missed deadlines. Although possible without wireless, such ubiquitous “everywhere, everytime” action will enable colleges and universities to continue to reduce student dropout.

same system for English courses. “We can use the iBooks to access material that is on the web and to find resources for our writing exercises. We also can generate content in class, read it, and proof it. The room provides a workshop environment for my students.” Trubek likens the feeling of the new room to a chemistry lab experience or a studio art class. “We can use the computers, but we also can put them away,” she says. “We have the option of using the technology or enjoying a more traditional teaching environment.”<sup>2</sup>

We often associate the phrase “anywhere, anytime” with the phrase “distance learning.” But most of us realize that in teaching and learning, what works best at a distance also works best on campus and even in the classroom or lab. The above illustrations demonstrate that wireless technology helps make it so.

With such beginning use of wireless, there is a distinct change in the air. For example, a librarian from a public school library in Michigan recently mentioned that some library patrons, possibly the more experienced computer users, were returning the checked-out wireless portables because, they said, the computers weren’t working. The librarian found out that

normally spent on connection and speed issues can be spent on the content and processes of learning. Further, confidence with technology also increases, and student satisfaction with the learning process isn’t hampered by technology support problems.

Cheaper and more ubiquitous wireless chips such as Bluetooth will allow wireless to stretch beyond typical computers.<sup>3</sup> For example, having a small wireless chip in a probe makes remote sensing a realistic laboratory experience even when that laboratory may be a class with students sitting on the banks of a stream as they gather data on dissolved oxygen, temperature, turbidity, and pH. Such ubiquity will allow wireless interaction to truly become the “everywhere, everytime” phenomenon that will extend our dream of “anywhere, anytime.” Just as Bluetooth enthusiasts dream of your PDA triggering the microwave, lights, and entertainment center of your home as you turn in the driveway at night, so the scenario of Maria’s buzzing minibook becomes more reasonable.

In her general-session presentation at the EDUCAUSE national conference in October 2000, Judith Estrin, CEO of

Finally, in a popular 1960s movie a recent college graduate had the word “plastics” whispered into his ear as the key to the future. Some of us remember when we sat on advisory committees for major vendors and shouted, rather than whispered, that they should remember the five letters that would make a difference in the future: “TCP/IP.” Even though higher education computing advisory councils are no longer as prevalent as they were just a few years ago, perhaps we can assist in the future by whispering the word “wireless” to those companies trying to probe and expand the future of learning and instructional technology and can thus help make that future truly “everywhere, everytime.”

### Notes

1. See <<http://www.apple.com/education/hed/macsinaction/siuc/>> (accessed October 25, 2000).
2. See <[http://www.oberlin.edu/news-info/00apr/gary\\_kornblith.html](http://www.oberlin.edu/news-info/00apr/gary_kornblith.html)> (accessed October 25, 2000).
3. See <<http://www.bluetooth.com>> (accessed October 26, 2000).

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