The Internet Age and Teachers: 2000-2010

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“I am entirely certain that twenty years from now we will look back at education as it is practiced in most schools today and wonder that we could have tolerated anything so primitive.”

*John W. Gardner, Secretary of Health, Education, and Welfare, 1968*

Clarions marking the demise of traditional K-12 education have repeatedly been heard over the years. Technological advances are usually the motivating culprit. Edison (1922) wrote that “the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks.” Needless to say, history said otherwise. From televisions to VCR’s to computers to handheld devices, the promise of a new age in education always seems to disappoint in the end. Cuban (1986) describes a cycle that is often repeated in the quest for change in education through technology: “exhilaration/scientific credibility/disappointment/teacher-bashing” (p. 5). The status quo is a powerful force. We develop comfort with our practices and institutionalize policies and attitudes that ensure a stable and predictable future. At the beginning of the decade there were great hopes that the Internet would be a place in which learners could interact and share knowledge as a way to transform the educational process (Kozma & Schank, 1998). Has the rise of the Internet changed K-12 education?

When we look at the number of computers in classrooms over the past 20 years, we can see a dramatic change in the quantity of technology available to teachers and students. Since the first inklings that computers might have a role in classrooms, businesses have been keen on getting schools to devote a bigger and bigger portion of their budgets to technology. Apple began the charge by donating thousands of computers to schools in the 1980’s in the hope that students would become accustomed to using Macintosh computers and their parents would buy them at home. Over time, Apple became less philanthropic and schools purchased the cheaper Windows machines instead. $70 billion was spent on school technology in the 1990's (Oppenheimer, 2004). In the end, there is now an average of 1 computer for class use for every 3.1 students (Nagel, 2010) while there was 1 computer per 20 students at the start of the 1990’s (Kim & Bagaka, 2005). We have gone from 84% of teachers having at least one computer in their classrooms at the beginning of this decade (NCES, 2000) to
97% of teachers by the end (Gray, Thomas, Lewis, & Tice, 2010). We have poured massive amounts of money into schools to make technology/the Internet accessible to students and teachers.

Of course, the biggest question is whether we have accomplished anything with that investment. Access is certainly not the same as a productive and effective use that ultimately increases learning. Accordingly, answering that question is a multilayered process.

- How has access to the Internet changed in the past decade?
- How has the Internet changed teaching?
- How has the Internet changed learning?
- What are the implications for education for the future?

As one peels through each layer, the issue of the digital divide is raised as well. In the following, I examine the first two layers and how or whether change has come to school via the Internet. I elaborate on all of these layers and discuss the digital divide and school learning at home in detail in an upcoming book from the Berglund Center.

Access

There has been significant growth in school access to the Internet over the past 15 years (see Figure 1). Beginning with only 3% of schools with Internet access in 1994, essentially every school in the country has access to the Internet in 2011, a phenomenal achievement. At the beginning of the Internet decade, a digital divide in schools existed in regard to number of computers as well as to Internet access. By 2010, the digital divide in school shrank, as 80% of students from families with incomes of $20,000-$24,999 used computers in school compared with 86% of students from families with income of $75,000 or more. In regard to the digital divide in schools now, there is not a significant difference (less than 3%) in the number of computers available between elementary and secondary teachers, city versus rural schools, size of school, or percent of students in school eligible for free or reduced-price lunch programs (Gray, et al., 2010). The Internet decade has seen schools’ physical access to the Internet become essentially universal, regardless of socio-economics, with an increasing number of students able to access it in their classrooms.
Teachers have access to the Internet. However, for teachers, access is relative. “The physical location and organization of computer technologies, whether the lab, classroom, library, or even school hallway, delimits and shapes the ways which teachers talk about and make use of their schools. As with the distribution of and access to any kind of resource, the distribution and organization of technology has an impact on the frequency and quality of teachers’ integration/implementation efforts” (Jenson & Rose, 2008). For example, it matters where the access to the Internet resides. If it is in a library, that leads to one kind of use for teachers. A computer lab implies a distinctive kind of use. A few computers in the classroom create still different ways of potentially using the Internet. Has that access changed teaching?

First, the Internet has fundamentally changed how teachers prepare for their lessons. 94% of teachers ‘sometimes’ or ‘often’ use the Internet to prepare for instruction (Gray, et al., 2010). Another element that is growing is the use of the Internet for teacher professional development. In a recent Boston College study of 330 elementary and middle school math and language arts teachers, courses online improved teachers’ instructional practices and subject matter knowledge, ultimately facilitating learning gains for students (Cohen & Orne, 2010).

Over the past decade, the Internet has developed into a great networking tool for examining others’ syllabi or course plans as well as tapping into state and district resources. In Oregon there is an excellent website created by the Department of Education in which there are searchable state standards as well as examples of assessments and activities tied to those standards. Other states have similar curricular resources. The past decade has seen teachers and states increasingly rely on the Internet to design and access curriculum.
Teachers will likely tell you that the most rewarding and the most challenging aspect of their job is meeting each individual student’s needs. There is also a sense that students’ physical and emotional well-being has changed over the past decade or two, leaving teachers to cope with a range of student behaviors that were not as prevalent in classrooms previously. In 71% of schools Individual Education Plans (IEPs) are now available through the Internet and 47% of teachers use those IEPs sometimes or often (Gray, et al., 2010). The complexity of issues that students bring with them to school requires teachers to have an understanding of medical/behavioral conditions they previously did not need to consider. Through websites such as WebMD.com, Wikipedia, and social networks, the Internet has become the ‘go to’ place for teachers to understand the diversity of students’ needs in their classroom.

States increasingly rely on the Internet for distribution of state standards and assessment of those standards. Online testing has revolutionized the evaluation of students’ understanding of the standards. When testing is managed through the Internet, states and teachers get immediate feedback regarding how well students do on the state tests. Approximately 94% of teachers use their computers for examining test results as well as entering grades and attendance (Gray, et al., 2010). Parents, students, counselors, and administrators can typically have access to that data at any time, facilitating monitoring of students’ progress and communication with teachers.

Teachers report that the majority of them are using computers in their classrooms for instruction: 40% often and 29% sometimes (Gray, et al., 2010). However, there was a significant difference between elementary and secondary teachers who reported that they or their students used computers in the classroom during instructional time (74% of elementary teachers, 59% of secondary teachers). Teachers surveyed in the National Center for Education Statistics’ study said that their students used technology in a variety of ways, many requiring Internet use (see Figure 3). However, over the past ten Internet years, the web has transformed. In 1999 DiNucci wrote “The first glimmerings of Web 2.0 are beginning to appear...The Web will be understood not as screenfulls of text and graphics, but as a transport mechanism, the ether through which interactivity happens” (p. 32). We have experienced a paradigm shift this decade away from the Internet as a resource to the Internet as interactive. The public has gone from consumers to creators to community. Schools are lagging behind that revolution. Most K-12 teachers have their students make use of Web 1.0 by doing research on the Internet to find information as opposed to using it as a publishing and discussion space, but few teachers had their students contribute to class web pages, blogs, wikis or similar Web 2.0 media.
While the statistics imply that quite a bit of technology is being used in classrooms, I’m skeptical. My experience as a teacher educator for the past two decades leads me to believe otherwise. For instance, the data is not clear on what teachers mean by “often” or how these tools are truly being used. I spend quite a bit of time in schools observing student teachers and walking the halls. As I peer in classroom doors, rarely do I see students using the Internet in classes in meaningful ways.

However, interactive whiteboards/smart-boards may be one recent technology changing teachers’ use of the Internet in the classroom. These are devices that create a touch screen on the wall for a computer, making Internet access easy. Many districts are investing in interactive whiteboards for classrooms. Sales increased by 43% in 2009 for Smart Technologies, the leader in the field, to $648 million (Moritz, 2010) in a market of $1 billion. There are a number of studies that find that teachers using interactive whiteboards can increase student achievement (Lopez, 2010; Marzano, 2009; Schmid, 2008; Swan, Schenker, & Kratcoski, 2007) so schools are jumping on the bandwagon. However, the technology encourages teacher-directed instruction so that student-to-student interaction decreases in classrooms (Latane, 2002), the boards are very costly (approximately $4,000), and some believe that the studies indicating increased achievement are weak and funded by the industry (McCrummen, 2010).

In summary, at the end of the Internet decade, teacher use of the Internet for instruction in the classroom has not changed teaching dramatically since Cuban’s research (2003) found that “the integration of computers into classroom
curricula and instruction techniques was minimal.” The statistics on teacher use are deceptive. While preparation for instruction and testing is certainly dominated by the Internet, teachers are not yet using the resources of the Internet for teaching students in significant ways. Interactive whiteboards are making direct instruction with the Internet more frequent in classrooms in recent years. However, multiple barriers continue to stand in the way of teachers seamlessly and meaningfully integrating the Internet into their instruction.
References


