Effectively Using Available Technology and Integrating it Into

The Twenty-First Century Classroom

Gabriel Kramer

Pennsylvania State University - Erie
Introduction

Technology is becoming one of the most important elements of the classroom, where students of the past would come to school with notebooks and pencils, students today come to class with laptops, mp3 players, and cell phones. Students today spend anywhere from five and a half to twenty hours a day utilizing technology, with approximately one and a half hours on the computer, just under two hours playing video games, and four hours watching television and listening to music (Rosen L., 2010). The large amount of technology available to students allows them to access any information at anytime due to the vast array of information available on the internet, a study from Jones (2002) shows that 73% of college students use the internet more than libraries. Due to the ease of access to all types of information, it is essential that current educators be able to effectively and efficiently utilize current technological tools. This paper will discuss: several types of technology that are available and potential drawbacks of using technology in the classroom.

Technology allows students to partake in experiences that they would otherwise not be able to experience, such as: field trips to outer space, viewing art and listening to music from around the world, and performing safe and cost effective scientific experiments. Integrating technology can be useful in the teaching of subjects such as: the fine arts, language arts, math and the sciences, and social studies, by viewing art, listening to speeches, or even using calculators (Parkay & Hardcastle, 2010). Technology gives students the ability to explore and learn for themselves instead of the traditional teacher lecturing, student listening method.
Types of Technology Available Outside of the Classroom

Currently there are many types of technology available to educators, compared to educators of the 1970s, where most technology was limited to chalk boards, overhead projectors, 16-mm movie projectors, and possibly a television set (Parkay & Hardcastle, 2010). Today there is much more available to educators in the realm of usable technology for education, such as: online social networking, YouTube, Blogs, Wikis, Podcasts, and E-Portfolios, which are just several of the ways educators are using technology (Parkay & Hardcastle, 2010).

Social networking allows students to express themselves creatively and to communicate with one another outside of the classroom, giving them the ability to work together in small groups to build a sense of community (Parkay & Hardcastle, pp. 406). Also educators may use social networking to communicate amongst themselves. Social networking gives educators the ability to discuss, in an informal way, their teaching practices.

Web logs (also known as blogs), are online journals created by an individual that others are able to view, blogging is becoming very popular with more than 70 million blogs existing in April 2007, and nearly 120,000 new blogs created daily (Guardian Newspaper, 2004). Educators may use these to post overviews of the topics covered during class, class notes, or assignments. Blogs are also an effective way for parents to stay informed of what topics are being covered in their child's class. Another key feature of blogs is that they can be interactive, where students may be able to ask questions and have discussions between themselves and the teacher. Podcasts are similar to blogs in that the instructor can post an audio version of his lecture for students to download and listen to outside of the classroom, but unlike a blog they do not allow for direct discussion. Podcasts and blogs in particular have been found to be successful tools in helping
English as second language learners develop a more concrete adaptation to the language. A study by Deoksoon Kim (2011) concluded that blogging and podcasting are excellent tools for educators to use in order to connect with the younger generations, especially language learners.

Similar to blogs, where instead of being run by an individual, a wiki is a website created, edited, and maintained by groups of people, and the information is validated by user reviews. Because wikis are maintained by multiple people, they follow the logic that many voices are better than one (Parkay & Hardcastle, 2010). An example of a wiki used as a learning tool would be a wiki that is made up of an entire class's research on a specific subject.

E-portfolios are similar to an electronic folder that allows students save collections of work on the internet, so that instructors are able to track student progress (Parkay & Hardcastle, 2010). These are useful when students must maintain a large collection of material for later use (ie. teaching portfolios, art portfolios, graduation projects, etc).

These tools are very useful in improving the climate in the classroom by reducing the gap between students and the instructor outside of the classroom, but what types of technology are available to the students while in the classroom?

**Types of Technology Available Inside the Classroom**

Educators currently have the ability to easily create lessons that involve different sorts of technology, from creating power points to showing informative online video clips, or exploring the seemingly limitless collection of information on the internet. An example of a technological tool for educators is the Multimedia Educational Resource for Learning and Online Teaching (or MERLOT), Merlot.org is a website that hosts "a collection of user-centered peer reviewed, higher education, online learning materials catalogued by registered members and a set of faculty
development support services” (MERLOT About Us). MERLOT gives educators easy access to tested and true teaching materials, thus improving the students’ receptiveness to the material presented by the teacher.

Also educators can use technology to expose students to art and music from different parts of the world, to show famous speeches, and to access hard-to-find journals (Parkay & Hardcastle, 2010). Along with just exposing students to what is on the internet, there are many interactive programs that allow students to perform experiments in mathematics and the sciences in a safe and cost efficient way. These tools may be as simple as a calculator that allows students to perform addition, subtraction, multiplication, and division (Parkay & Hardcastle, 2010), to complex modeling systems used in advanced mathematics and physics courses (ie. Maple, Pro-Engineer, Visual Studio, etc). An experiment by Sarantos Pycharis (2011) made college physics students use computer programming languages to model physical phenomena, and it was concluded that using this technology helped the students' developmental process. Technology simulations can also be used in language labs, where students can use text-to-speech (TTS) software to learn to read and properly pronounce words, these programs provide the individual instruction that students need and TTS improves the students' reading ability, vocabulary retention, and pronunciation (Parkay & Hardcastle, 2010).
Integrating Technology into the Classroom

One of the simplest ways to involve technology into the classroom is to have students listen to their mp3 players if they seem to become easily distracted or frustrated, because "to them it is second nature and actually silence is their distraction" (Rosen L. D., 2010, pp. 20-21).

At Purdue University, Sugato Chakravarty's consumer science course is one of two using a software program called Hotseat, which allows students to ask questions via their laptops, cell phones, FaceBook, or Twitter during lecture (Young, 2010). Utilization of this technology is favorable amongst educators who feel that educating must be more interactive, and that educators must no longer play on the role of "sage on the stage" and that they must veer towards being "a guide on the side" (Young, 2010). According to Larry D. Rosen's research when students communicate online, they are less shy and interact more honestly compared to a traditional classroom setting, "Allowing some class discussion to happen online will encourage the shy students… to express themselves" (Rosen L. D., 2010, p. 21).

Another form of technology used in the classroom is video simulations and games. A meta-analysis of using simulations in the classroom conducted by Randel, Morris, Wetzel, and Whitehill (1992), found that from 68 studies, 38 (56%) found no difference, 27 (40%) found that students favored the video games, and 3 (4%) favored formal instruction when simulations were introduced into the classroom. Research shows that success from using video simulations or games in the classroom depends on congruence and appeal, if the subject being studied and game activity are congruent, learning increases, but if the material and game are separate, the opposite happens and learning decreases (Charsky & Ressler, 2011).
Overcoming Obstacles in Technology

It is clear that there are many different types of technology available to educators. But it is not all good, along with the vast collection of good information for students and educators there is also 'bad' information. Being able to put information on the internet has many advantages; instantaneous access to information anywhere in the world, and being able to communicate a large amount of information quickly (Kubiszewski, Noordewier, & Costanza, 2011). But since a lot of the information placed on the internet has little oversight, there is little differentiation between the 'good' and 'bad' information published (Flanagin & Metzger, 2000; Johnson & Kaye, 1998). Because anyone can make information available on the web, there has been an increase in published misinformation (Mintz, 2002). A study by Ida Kubiszewski (2011), observed the ways in which students perceive credibility of internet encyclopedias (namely Encyclopedia Britannica, Encyclopedia of Earth, and Wikipedia). The study observed that users of websites find them more reliable when (1) there is an author listed, (2) there are references listed, (3) the lack of presence of a biased sponsor, (4) an award is displayed, (5) the article is designated as an Encyclopedia Britannica article (compared to Wikipedia or Encyclopedia of Earth which are both free, open source encyclopedias). This study shows that even though there is a lot of misinformation available, most users are able to perceive the credibility of websites (Kubiszewski, Noordewier, & Costanza, 2011).

Other problems with integrating technology into the classroom, is the teacher's level of confidence with the technology and the student's availability to the technology. Researchers found that teachers overcome the integration of technology into their classrooms in five stages: (1) the entry stage, where teachers become comfortable with the technology, (2) adoption stage, where teachers become proactive towards integrating technology, and begin pushing students to
learn to use technology, (3) adaption stage, where teachers begin using technology to teach, (4) appropriation stage, where teachers explore new possibilities afforded by technology, (5) invention stage, where teachers collaborate and develop new learning activities (Sandholtz, Ringstaff, & Dwyer, 1997). It is clear that integrating technology into the classroom will take time and training, which add costs (that school districts may or may not be able to afford) to the school districts supplying this training, thus holding back the true potential of technology in the classroom. Currently there are programs that that require aspiring educators to become comfortable with technology, an example of this is at Boise State University, where education students are required to complete 15 hours of technology field work in a public school classroom with a teacher who has successfully integrated technology into their curriculum (Parkay & Hardcastle, 2010).

Though the technology is available, being able to use technology in the classroom is a necessity for twenty-first century students and educators, but it may not be possible for all students (low income neighborhoods, inexperienced educators, etc). In order for all children to be exposed to the benefits of technology the government has played a major role in integrating technology into all classrooms (Parkay & Hardcastle, 2010). Due to the expense of technology the government initiated, in 1996, the Education Rate program, which helped almost all schools in America receive broadband internet (Parkay & Hardcastle, 2010). Funding for technology also comes from the No Child Left Behind (NCLB) act, which plays a major role in the funding for educational technology and "nearly a quarter of states report that NCLB funds are the only source of funds for technology" (Parkay & Hardcastle, 2010, pp. 418-419). Even though this funding is sufficient to supply the hardware, most schools (around 70%) cannot afford on-site technicians to maintain the hardware and software (Furger, 1999).
Making the technology available to some students is no concern at some colleges, such as Duke University, which has taken on the iTunes U initiatives (along with The college of Education in the University of South Florida, California-Berkeley, and University of Wisconsin at Madison, along with others), but unlike the others listed Duke has distributed iPods to all incoming freshmen since 2006 (Kim, 2011). But funding at lower grade level schools (K-12) may not be directly available, due to the enormous expense of purchasing and sustaining the technology. But these obstacles must be overcome in order to take schools from the 1950s into the twenty first century.

Conclusion

Some say that technology is holding us back as a country, but it is there, it cannot be ignored; instead we should embrace it and learn how to use it, and where better to begin than in the classroom. There is a lot of technology already available, all that has to be done is to integrate it into already existing curriculums, it may not be easy, cheap, or accessible by all students, but it must be done in order to move the education system into the twenty-first century. Because "We can no longer ask our children to live in a world where they are immersed in technology in all parts of their lives except when they go to school. We must rewire education or we risk losing this generation of media-immersed, tech-savvy students who are often brighter and more creative than we realize" (Rosen L. , 2010, p. 22).
References


