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The Effectiveness of Using Technology in the Classroom

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## Abstract

Every day a new piece of technology is being developed somewhere around the world. As we find new uses for technology, the question arises how we can integrate it into our educational setting. Not only is it hard to get the technological equipment into the classrooms, but training is needed to teach the technology. One wonders, should we have technology in the classroom? If we have it, is it being used effectively or is it just being wasted? Are teachers able to integrating it into their curriculum or does it become an extra pieces to teach? The discussion over the effectiveness of technology in enhancing student learning has not come up with a clear-cut answer, but the questions will continue.

The Effectiveness of Using Technology in the Classroom

If one enters almost any school across the United States, you are bound to find at least one piece of technology that could be used in the classroom. The technology can be used by teachers to better teach curriculum and by students to become more technologically savvy: overhead projectors, VCR's, computers, digital cameras, PDA's, etc. Although it is probably rare to find a classroom with all of this technology and more, it has become more and more common to find many technological components in schools.

This increase in technology in the classroom is parallel with the advances the world has made in all facets of technology. Society is bombarded with the newest technological development that promises to make our lives easier. It seems obvious that if our world revolves around technology in all areas of our lives, children should be educated in how to use this technology and educators should teach using this technology. The children our the countries future, and thus they should be able to completely function in our technological world. Although schools throughout the United States try to have more technology on hand for the students and teachers to use, it is not clear if the technology is being used in a way that is effective for all parties. Do we know if technology is in the classroom is benefiting our students?

#### Studies for the Effectiveness of Technology in the Classroom

During the 2004-2005 school year, the U.S. Department of Education is studying the effectiveness of technology in two subject areas, reading and math. This study will look at 16 different software products to see if there are any student achievement gains in those subject areas (Roach, 2004). Since technology changes so rapidly, it will be great to have an investigation that studies up-to-date technology.

There have been studies done in previous years that analyzed the quality of technology use in the classroom. In 1994, a survey found that 14% of public school teachers had more than eight hours of computer training a year and in 1995, 50% of teachers had little or no experience with classroom technology (Rodrigues, 1997). If teachers were not qualified to teach or use technology, one can assume that it was not an effective tool in the classroom. Apple Computers did a case study in 1995. From their study they concluded that "students provided with technology-rich environments continued to perform well on standardized tests, but were also developing a variety of

competencies not usually measured. Students explored and represented information dynamically and in many forms; became socially aware and more confident; communicated effectively about complex processes; became independent learners and self-starters; knew their areas of expertise and shared that expertise” (Rodrigues, 1997). If one believed only this study, it would be ridiculous to not have a “technology-rich” environment for our students. This study shows that we must integrate technology into our curriculum.

Another study done in 1995 by RAND Corporation concluded that again schools that are “technology-rich” produce students that are achieving at high levels along with being interested and engaged in their learning. (Rodrigues, 1997). The U.S. Department of Education did a study in 1995 that looked at nine “technology-rich” schools. They found that “the use of technology resulted in educational gains for all students, regardless of age, race, parental income, or other characteristics. (Rodrigues, 1997). From all of these studies, it would be easy to conclude that a school environment that is filled with technology equals high student achievement. However there are some that offer some opposition.

#### Problems with Technology and Education

There are some that are a bit skeptical about how technology has and will impact education. David Skinner (1997), author of the article *Computers: Good for Education?* discussed the lack of evidence that demonstrates the positive impact of technology in education. He sites a RAND study that describes how there has not been an evaluation of this topic done that would demonstrate to policymakers that they should invest in the technology for schools. A “perfect experiment” to determine whether technology is effective in the classroom has not been done. To do this, there would need to be two sets of schools, one with a “technology-rich” curriculum and a second that does not use computers as part of their curriculum. This of course has not been done. The RAND authors continue by saying that they have not found enough schools to do this study (Skinner, 1997).

Skinner goes on to discuss the problems with how we are using technology in the classroom. For example, an Electronic Learning article discussed how using online historical archives is a great way to integrate technology into the high school history

classroom. Skinner does praise some of the online material such as pamphlets, photographs, government documents, interviews of former slaves, and Walt Whitman's notebooks. However, most of the information he found was not challenging and he notes that the amount of good information on the internet does not even make a dent in what we have available to us in print. Skinner believes that using these types of materials teaches the students that school can be easy. Instead of having to search through a variety of material in books to find the information you need, you can go online and the information is sifted for you.

Skinner even finds issue with word processing. Students are able to revise easier with word processing (spell check, grammar check) with just a click of a button. Skinner worries that it also "encourages a student to move from one stage of writing to another all too quickly" (Skinner, 1997).

Al Rogers, a computing and education writer, stated in an article that "Large segments of our society use [computers] to collect, produce, manipulate, analyze, synthesize...with the advent of the Internet in the academic and research community, we now add the ability to collaborate, communicate, share, exchange...unfortunately, these tasks are exactly what most schools and most teachers are not equipped to accomplish since the educational industry today requires teachers to "deliver" a prescribed body and sequence of knowledge. (Skinner, 1997). Skinner believes that Rogers and other advocates of technology in education want "schools that have the buzz of real-world hive without acknowledging what kind of education those who now run the real world had in their time" (Skinner, 1997). This is a very interesting point. Our society is now so largely reliant on technology and most successful adults are very technological savvy, but their education in school was not as "exciting" as the technology advocates want it to be.

The Third International Mathematics and Science Study (TIMSS) released findings in 1997 from a competition between fourth graders, eighth graders, and twelfth graders from 26 countries, including the United States. This competition is also used as a way for educators to see what they are doing right and where they need to improve. In looking at the results, Samuel G. Sava is concerned whether we have learned how to apply technology correctly into school instruction. For example, the TIMSS showed that our fourth graders were outperformed by seven other countries on the math portion. The

interesting part about it is that five of the countries had their teachers report that they “never or almost never have students use computers in the class”. (Sava, 1997). This does not show that computers makes a difference in achievement when 37 percent of students in the United States use computers for some of their math lessons (Sava, 1997).

Sava goes on to question some other aspects about technology in the classroom. He does not understand why schools across the United States are eliminating important things such as librarians, music programs, and teachers of art and physical education so that they can spend money on technology coordinators and computers. This is so surprising since it is hard to say that we have any concrete evidence that technology raises achievement in our students.

#### Reasons to Integrate Technology into the Classroom

Just having access to technology will probably not help improve student achievement, but if integrated completely into the curriculum, many think that it will lead to success. The problems with how we have used computers in the past have led to the skepticism. It is not uncommon to see an individual or group of students on the computer while the teacher is teaching other students, not working with the students that are on the computer. “The technology serves as an adjunct to education: a subject for establishing basic literacy, not a tool for communications and productivity integrated into a comprehensive curriculum (Rodrigues, 1997). When schools first started to implement technology into the classroom, it was basically for drills, practice, games, and busywork. William Rodrigues notes that if technology is integrated into the curriculum, that can lead to learning, productivity, communication, and higher-order thinking. Rodrigues quotes Professor James J. O’Donnell in his article to support his idea of integrating technology into the curriculum. “It should support student performance of an authentic task; it should be integrated in activities that are a core part of the classroom curriculum; it should be treated as a tool to help accomplish a task, rather than a subject of study for its own sake. To sum it up: students and teachers should be using computers for learning, not learning in order to use computers.” (Rodrigues, 1997).

The National Academy of Engineering and National Research Council’s report on Technological Literacy states that it would be ideal if Kindergartener’s begin with the learning about technology, and that throughout a student’s academic career, technology is

connected to all subjects. “Schools need to move beyond the perception of technology as a separate subject to be taught in ‘shop class’” (Anonymous, 2002).

The support to integrate technology into the curriculum continues in an article by Henry J. Becker. He suggests that evidence points to the problem with students learning anything in a “piecemeal fashion” such as computer time once a week separate from the curriculum. He continues by stating that competency in any area of learning happens “when tools can be called upon as they become relevant...in the context of doing work.” (Becker, 2000). Thus, having many computers in the classroom (Becker says five to eight) available and integrated into the learning is ideal. Having computers in a separate lab usually leads to less teachers using them.

In Robert Wald’s review and commentary on Larry Cuban’s book, Oversold and Underused: Computers in the Classroom, Wald notes why Cuban thinks we must integrate technology into our curriculum. He sites three reasons for using computers in education. The first is for such things as paperwork, gradebooks, and communication. Wald states that this is a widely accepted reason to use computers in education. The second reason causes some debate. Cuban believes that by having computers in education, we are making the students employable by having basic computer skills to join the technological world. His third reason is to transform teaching methods. He notes that even though teachers and students are using new technologies in the classroom, they don’t use them enough and that classrooms are still run the same way they were years ago. (Wald, 2003). “They just have expensive toys in the corner” (Cuban, 2000).

#### Ways That Technology Has Been Used Effectively

There is some evidence of specific technology being used in a classroom to promote high achievement. Some teachers are having each student use a PDA (personal digital assistants) in various components of their learning. PDAs can be used in all facets of learning from writing, math, and communication. One benefit of PDAs over computers are that they are able to send work from one PDA to another very easily. This way, teachers can send information about a project to the students and students can send questions to the teacher. Students have their own PDA as opposed to sharing a computer. One great benefit is that educators can install different software to each student’s PDA

that meets the need of each particular student (Yuen & Yuen, 2003). This last point is an important one because it can lead to improved learning.

Another place that technology has led to effective learning is in social studies in elementary school. To make students feel more connected to social studies, teachers can use CLASP (classroom lore and artifacts study project) using technology. Students can create timelines, calendars, time capsules and time machines on their computer. They can add animation and graphics to these components to make them more “real”. They can create maps and report data. They can present all of the information they learned throughout the year using PowerPoint. Students using this method feel ownership and responsibility for learning (Hakes & Eisenwine, 2003).

In 1998 the Massachusetts Department of Education funded a project called the Learning Network, to connect technology to curriculum, integrating the state’s standards. Teachers from nine school districts. The projects that were developed from this group are a great example of integrating technology with the curriculum and standards. One part of the project had the teachers creating a virtual museum of the Blackstone Valley (where they live). However, it is noted that they teachers received professional development and wonderful equipment to work with which led to the success of the project. The teachers met on a monthly basis for the entire year (Danker, 2000).

Just this last year, a group of researches at MIT and the University of Washington set out to develop an Education Arcade. They hope to change how games are used in classrooms, hoping that games will not be used as the treat at the end of getting your work done but instead integrated in the curriculum. They hope this will spur new game development projects as one positive (Roach, 2003).

With all of the information on technology in the classroom but little hard evidence about its effectiveness, it is hard to say where we will go on this issue. With schools being funded by states and taxpayers, it will probably be important to have proof of the value of technology in education. However, our society is almost run by technology, and it is easy to conclude that things come much easier when one is technologically savvy. As the debate continues on how and why to use technology in the classroom, it seems that schools will try to continue to implement it into their school day.



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