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John Shimer

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## Abstract

This paper addresses classroom technology as a much deeper concept than many would like to believe. It is not something to be taken lightly by only looking at what is currently available, but rather examined through a brief history, in-depth tests, and the consequences as well as the benefits of new developing technology. Furthermore it is not an issue only important for educators and administrators but requires involvement from parents and more importantly Christians to ensure that students are given the greatest opportunity possible for their future. Since technology is the future of children's education, it is imperative that it be understood by all those involved to ensure that its benefits are maximized and its problems handled efficiently.

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# Educational Technology: Beyond the Basics

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This paper addresses classroom technology as a much deeper concept than many would like to believe. It is not something to be taken lightly by only looking at what is currently available, but rather examined through a brief history, in-depth tests, and the consequences as well as the benefits of new developing technology. Furthermore it is not an issue only important for educators and administrators but requires involvement from parents and more importantly Christians to ensure that students are given the greatest opportunity possible for their future. Since technology is the future of children's education, it is imperative that it be understood by all those involved to ensure that its benefits are maximized and its problems handled efficiently.

Use of technology in education has become expected in today's world. If parents, educators, and researchers want to go beyond a few statistics to find the truth about this issue they must briefly look at the history of educational technology, prior to studying the use of it today, the methods that can be used to test its success and what parents should do about the negative side effects that do exist. Thorough analysis of these details may not lead everybody to developing the same opinion, but it will lead them to the most solid foundation for them to basis their opinion on. Educational technology is not only beneficial for today's classroom but essential to it. More importantly, as Christians it becomes even more important to strive after technology in the classrooms to fulfill God's calling for our lives of doing our best in everything.

## The Facts Regarding Classroom Technology

### History

The classroom of the early 1900s was completely teacher centered, unlike the modernized rooms commonly thought of today. Schools had come a long way from the one room schools of previous years and were divided much the same way the current education system is with different rooms for every grade. However, these classrooms were by no means modernized since they were completely untouched by technology of any form. The students spent their day giving quick short answers as the teacher spouted off question after question at a rate of nearly 200 questions per hour (Cuban, 1984).

This all dramatically changed at the entrance of multimedia into the classroom. Educational technology is not a modern invention, but was in use decades before the invention of the computer. The film era began in 1895 with the invention of the motion picture camera (Yahnke, 1996). Films did not make their way into the classroom immediately but it was only a matter of time before education reformers grabbed hold of the new technology and began to implement it in the classroom. The first record of schools using film in the classroom was a public school in Rochester, New York in 1910 (Cuban, 1984). Thomas Edison, one of the reformers leading the charge in educational use of film, stated "Books will soon be obsolete in the schools… Scholars will soon be instructed through the eye. It is possible to touch every branch of human knowledge with the motion picture" (Saettler as cited in Cuban, 1984). While the statistics in regards to the specific use of film are flawed for various reasons, it can still be concluded that nearly forty years after the development of films in education they were still used infrequently. Reasons for the infrequent use include lack of teacher's skill, cost, inaccessibility of equipment, and difficulty of properly incorporating a film in to the class topic (Cuban, 1984).

Starting shortly after the initial use of film in the classroom, radio began to make its way into the classroom scene in 1923 at Haaren High School in New York City (Cuban, 1984). Many of the same hopes and plans that were discussed in regards to film were brought up with

radio. The radio was often referred to as "textbooks of the air" with the hope that "The time may come when a portable radio receiver will be as common as is the blackboard. Radio instruction will be integrated into school life as an accepted educational medium" (Levenson, as quoted in Cuban, 1984). While the classroom use was not as popular as once predicted, it was still more successful than film. One of the main reasons for the difference was availability and reliability of the equipment. Not only was radio equipment significantly less expensive, but the technical problems that did exist were largely eliminated within the first decade of use (Cuban, 1984). While educational radio was largely a success, the biweekly programs only ran for thirty to sixty minutes, and were not capable of replacing teachers. However, a survey of Ohio schools shows over seventy-five percent of schools were using radio to some extent in the classroom to supplement the teacher's lessons (Cuban, 1984).

The 1950s marked a new era for classroom technology, an era that is largely responsible for radio being less successful than was originally hoped. The advent of the television brought another chance for education reformers to push for a newer, better technology. Television was referred to as the "radio with its eye open," with one of its greatest supporters, Ben Darrow, saying "When the eye and the ear have been remarried in television then we shall indeed be challenged to open wide the school door. There will be no 'blindness gap' to be bridged" (Cuban, 1984, p. 26). Educational television was becoming very popular and was hoped to serve as a lifesaver for the teacher shortage that was occurring. Unfortunately most of the time, the television, as the radio, was not a substitution but rather an addition to the teacher and therefore it too was incapable of effectively alleviating the teacher shortage (Cuban, 1984). However, educational television continues to play an important role in today's classrooms although its usage has decreased since computer technology began to gain popularity.

**Today's Use**

In the modern world classroom technology has developed leaps and bounds beyond the use of televisions. Computers have begun to dominate the modern classroom to an extent that is unbelievable. There have been significant changes in the amount of educational technology used even in the past few years. As recent as five years ago the classroom computer was used for occasional research and a possible presentation. In 2006 educators have greatly realized the efficiency gains through the use of computers in the classroom. A few areas have proven to be overwhelmingly more efficient and productive with the use of technology. While many of these functions are possible without the use of computers, the technology often reduces time and possibly increases the accuracy. The basic categories are: the anonymous collection of student data, teacher's assessment of the student, and research. Research is one of the most common uses of classroom technology. The internet gives students immediate access to a number of sources so vast that no single library would be capable of holding the information (Nilson, 2005). Lastly, students can benefit from "simulated experiences" through internet and software based programs of many types (Nilson, 2005). There are specialized programs designed for nearly every subject in school in addition to many great universal programs (Means, 2004). This category is important and worth further study and consideration among all teachers seeking to maximize their students' learning.

Math, one of the most forgotten subjects in educational technology, has many sources available to assist teachers of all levels, by helping students understand basic concepts and visualize the more conceptual ones (Roblyer, 2006). Geometer's Sketchpad, a specialized computer program, is described by its developers as a "dynamic construction and exploration tool that adds a powerful dimension to the study of mathematics," and is only one example of available mathematical software. While specialized programs have proven to be a great resource, there are also more common and affordable programs that have great educational value. Many subjects, including math, can be taught by basic programs such as Microsoft Excel. Excel or similar spreadsheet programs can be used to help students visualize graphs, in addition to saving precious class time by completing both basic and complex calculations (Roblyer, 2006).

Beyond the mathematics realm, word processing programs are another example of popularly used programs in the professional and educational world and have proven to have the greatest impact on education out of any current technology. Word processing programs are more efficient, allowing students and educators to edit existing work rather than rewriting

the entire document. However, they are capable of going well beyond saving time to improving the writing skills of students through writing practice and specially designed activities (Roblyer, 2006).

Unfortunately teachers are not necessarily prepared to use technological tools proficiently (Means, 2004). Due to the lack of support, teachers often choose to avoid using technology as a teaching medium all together. In some cases, such as at Canisius College, a small school in Buffalo, New York that was recently renovated; problems arise. In their attempt to provide accommodations for the possible different mediums the teachers may want, they overcomplicated the classroom. Between the confusing a/v switcher and the awkward controls that set the lighting, screen position, and many other things teachers were often left clueless and how to operate any of the technology (Lloyd, 2000). On the opposite end of the spectrum many small private schools struggle to find the funds to invest in the needed technology. Hesperia Christian School, a small private school in California, claims to have moderate use of this technology. The school uses computers at mixed levels, depending on the specific teacher, since there is not a uniform policy implemented. In the elementary school level, many of the more established teachers choose to use computers and other new technology less frequently if at all, while most of the teachers who graduated from college recently have embraced the new technology to a greater degree. The high school level does incorporate computers on a wider level, because "the teachers have realized it is a part of the society." While most of the teachers use only basic computer programs such as word processing and presentation software, some teachers have implemented projects in which movie making is an option. The school currently lacks advanced computer programs and teachers and administrators have done their best to give students the opportunity to use computers to further their education (Jim Boston, personal interview, October 30, 2006).

**The Test**

The idea that technology improves student's education is widely accepted. However, the extent that technology helps and which specific aspects of technology are helping needs to be regularly tested. The most widely used method of testing technology's success is the randomized testing of control groups. This idea follows much of the same formatting that medical researchers use to test new a drug or treatment. Two random groups of students are selected to be observed and tested. The size of these groups can vary from different districts, schools, or classrooms at any distance apart from each other (Haertel, 2003). In order for the randomized testing to be successful it must meet certain requirements, the first of which is that the technology must be imposed upon the students purposefully rather than by chance (Moses, as cited in Haertel, 2003). The variables that could affect the results besides the technology involved must be recorded and applied as uniformly as possible to all the students (Moses as cited in Haertel, 2003). It must be a priority for those conducting the research to ensure that outside sources affect the data as little as possible.

Unfortunately, developing groups for randomized testing is only the first step in conducting a reliable test of technology's success. Once the groups have been established, the researchers must figure out exactly what to do with these groups and how to assess them. Generally there is some type of interview process involved in which students and teachers are asked questions about their use of technology in the educational process. While it is an established fact that neither this type of study, nor any other individual study type, is enough to fully understand the effects, it is the one most widely used (Hedges as cited in Haertel, 2003). The main question that educators and parents want to know is "are computers enhancing student learning?", but this is not a question that can be asked directly. Questions must be more detailed to find out specific information about the use of technology in the classroom and what parts of it are successful and which parts are not successful (Haertel, 2003).

Beyond the need to test specialized programs, researchers must evaluate the use of the internet for research which is rapidly increasing in popularity and is second only to word processing in educational technology (Haertel, 2003). This is an exceedingly difficult category to test, because it is difficult to control this specific area. Often, students that are placed in the internet group will end up choosing to go another route for their research and not using the internet. Perhaps more frustrating is that researchers are discovering it is nearly impossible to place students in a control group that prevents them from doing things such as computer research at home (Haertel, 2003). In the

year 2000 over fifty percent of the nation's households owned at least one computer and sixty-five percent of households with students living in them had computer access at home, with those numbers increasing rapidly since then (Pastore, 2001). With such a large number of students having computer access at home, it is difficult to prevent students from conducting internet research. (Haertel, 2003).

**Parent's fears**

Parents, while loving the benefits of the technology, also have many fears of what the internet holds besides the vast amounts of useful information. They worry that their children may find sites containing explicit material ranging from pornography, inappropriate chat rooms, and sites containing information about the abuse of drugs, alcohol, and other substances. It is beyond the issue of parents trusting their children, because it is unbelievably easy to accidentally stumble upon an inappropriate webpage. Inappropriate websites can be stumbled upon through simply mistyping in a search engine, double meanings of words, and slightly varied or incorrect web addresses. These mistakes are very common and to some extent unavoidable since there are so many chances to make these errors. Beyond these types of mistakes students may also find themselves clicking advertisement links and unsuspectingly finding themselves where they do not want to be. Often before the student even realizes what they are looking at they have been led to some other site containing even more inappropriate material than the advertisement (Thornburgh, 2002). This leaves innocent web-surfers subject to finding inappropriate content on nearly every page without warning and often no way to get rid of it before more has arrived.

With so many parents aware of the dangers, many have expressed concerns to the large use of technology in school. In response to a concerned parent's questions on her student using computers within the school, a faith based organization, Gateways to Better Education, suggested exploring the school district's policy. The first step is to see if the school intends on using any filtering software to limit internet access (Gateways, 2002). These programs are wide in variety and restrictiveness but have proven to be incredibly helpful in preventing students from purposefully or accidentally viewing inappropriate material. Additionally, these programs may also be useful in the home to ensure their safety beyond the classroom.

The second policy to consider is if the school is not going to be using a filtering program, will there be adults supervising the students while they use the internet (Gateways, 2002). The supervision method is not as simple or accurate as it may sound. The supervisor must be able to easily see every computer and quickly react to anything that is inappropriate to ensure complete safety for all the students involved. It is necessary that responses are quick so that the supervisor would be able to provide a safer environment for all the students.

Lastly, the issue must be addressed that if the school chooses not to take any precautionary measures they are choosing to face the possible consequences. The district is then left open to several lawsuits including "contributing to the delinquency of minors, allowing a sexually hostile learning environment to exist on campus, and allowing obscene material on campus" (Gateways, 2002). With such severe possible retaliations, schools should see it necessary to find some form of security to prevent students from accessing inappropriate sites while at school. Further research shows that schools are realistically one of the safer places for students to use the computers because in addition to the software safeguards most have in place, they are public locations. People in public places are highly less likely to intentionally look for inappropriate websites for fear of social criticism and discipline that might ensue (Thornburgh, 2002).

**Discussion**

**History**

While it is funny to think of a classroom without computers, it is unimaginable to think of a teacher being excited to see a television in their classroom. Although television, film and radio appear to be outdated mediums, looking at these early technological advances and how educators responded to them not only give us ideas of what to expect out of computers but what to expect out of future technological developments. The older technology was amazing for its time and revolutionized the students and world of its time. The computer generation largely owes what it has to those educational reformers that first brought the silent films into the classroom in order to enhance student learning.

Today's Use

Beyond the advances in the movement of technology to computers, it is amazing to see the ones made within computers themselves over the past few years. The advantages that students and educators in the modern classroom have seem to be immeasurable; from the ability to easily collect data, assess student's abilities, and access to unimaginable amounts of information at the touch of a button. The greatest advantage that can be offered to today's students is undoubtedly the hands-on experience available through simulations that many programs offer today. The Geometer's Sketchpad program is one of the greatest tools currently on the market for teaching mathematics to junior high and high school. After having personally used this program in student teaching environments, I realized the benefits of hands-on learning.

Computer programs such as this one give students who do not learn as well from taking notes a chance to engage with the material, often increasing their comprehension. Every parent wants to give their child more than they had which has become exceedingly more likely with the technological advancements the educational world has seen. Perhaps even more beneficial is the ability to use the more basic programs to advance education. By allowing students with any computer access to have hands-on experience, through either specialty or basic software, they are being given a chance to learn material in ways that were not possible to learn them before. Through research and experience I've come to appreciate the more authentic learning experience that is available when material is presented in a hands-on environment.

These improvements leave the average person confused why administrators have so much control over what teachers are given access to. While budgets are a large consideration of what the districts offer it is really not an acceptable reason to not invest in children's education. Regardless of cost, students should be given as many of the highest quality opportunities to get the best education possible. Many math teachers would benefit from Geometer's Sketchpad, but the districts deny them this resource. Christians, along with other concerned parents, should strive to make technology and the best education more available to students. It may seem strange to attach Christians to the efforts of educational technology improvements, since it is not an issue that Jesus, Paul or any of the writers in the Bible addressed directly, but it is still extremely relevant to the faith. God has called us to go beyond what is simple and doable to do our best. As God's servants we are called to serve Him with all of our abilities, but this goes beyond giving to the church to extend to all that we do. As experience proves that technology is the best for our students and that doing our best honors God, Christians should strongly encourage the use of technology in the classroom.

**The Test**

It is a generally accepted fact that computers and other technology used in education have provided students with better opportunities for learning, but I find it incredible the detailed methods already in place to test specifics of the technology and its success. The "Enhancing Education Through Technology" section of the "No Child Left Behind Act" of 2002, once again brings into question what level should the teachers have a say in the design of their own classrooms. The government is attempting to assure that each child receives the best education possible (Learning Point Associates, 2004). However, often the programs that are invested in prove too difficult to use and do not always demonstrate to educators the fruits of their labor, yet investment will still continue if the material is not adequately tested. Testing shows the problem of the government making the decisions rather than the teachers.

It is important to notice that unfortunately the methods for testing involve comparing a group with the advanced technology to a group without the technology. This proves to be a reasonably accurate method, but does beg the question, are we really "leaving a child behind." If not every student is given the best possible chance to succeed we have failed as educators and as Christians. This means if every student is not given access to a useful program we have not succeeded in providing them the best opportunity and have failed that student. On the other hand if we are forcing students to use programs that do not help in their learning we are wasting their valuable learning time and have failed to give them the most efficient education.

We are in a dilemma of how to test the advancing educational system without preventing students from

receiving the best. This is one of the greatest benefits to choosing a system like Lesgold's in which the tests are compared to a baseline rather than a control group. This allows more students to participate in advancements that may dramatically improve their education. However, even this system has problems in that it requires long-term testing, which could mean students continuing to use programs that offer little to no benefits. Ultimately there is no perfect solution in which we can consistently offer the best education to every student. It is a fact that some students will receive technology with amazing benefits while others will not. On the other hand, some students will continue to be hindered by non-beneficial applications. The goal, then, as educators and Christians becomes to offer every student advanced technology as soon as it has proved its worth and to end exposure as soon as possible to programs that are hindering student's learning.

**Parent's Fears**

With technology having so much to offer education, it almost seems as if it is too good to be true. Sadly, all the facts in favor of classroom technology do not come without a price. The internet, in addition to its great resources has left children free to find inappropriate web pages their parents do not want them to see. Educators often try to ignore the problem with the technology because they just want to focus on the benefits. As Christians we are called to do the best possible, but that requires examining the whole picture. Unfortunately, the perfect solution of eliminating the inappropriate material from the internet all together is not possible, therefore schools must step up to ensure safety of the students. Parents should not just trust that the schools are "doing the right thing" on their own, but rather should get involved with their students' education. Schools that have not implemented appropriate security measures will be much more motivated to do so if parents prompt them.

Secondly, parents should also be sure that they are doing the right thing by protecting their own home. While classroom technology has become a huge resource, many educators also send home internet assignments with the students for homework. With the use of computers at home for education, many parents are allowing students to have their own computers in their bedroom or other places where supervision may not be possible. Beyond software protection, parents should be talking to their students about what is online and what is appropriate to look at. Parents cannot just rely on the hope their children will not find the explicit material even with filtering software, because the software is not one hundred percent accurate. Additionally, school and home are not the only two places children may use the internet. It easy to forget that children may be using the internet at a friend's house whose parents may or may not have invested in protective software. The mere thought of this should give parents more motivation to talk to their kids about technology so they will understand what is out there and what is appropriate to look at.

A thorough investigation not only gives proof that technology benefits students, but also that as Christians we should strive to encourage the appropriate use of classroom technology. The subject is not something that should be glanced at, but rather, examined carefully. Through history it is evident that while the types of technology may change it is something that will definitely not go away. Parents, educators, and Christians must involve themselves to ensure that all the decisions of children's future are not made by an administration that is only after statistics which may or may not accurately depict the helpfulness of technological advancements, but rather based on accurate studies with thorough analysis.

**Conclusion**

Classroom technology began long before the invention of computers and has gone through many different types of technology at various levels of integration. Regardless of understanding of the history of technology in education, it is a widely accepted fact that it has benefits. However, to fully understand the use of classroom technology it is essential to do a complete examination of its history, current usage, the methods to test it and parents' reactions to the negative effects it could have on students. Once educational technology has thoroughly been examined, it should become clear that when everybody takes a part it can be a safe and effective learning tool that provides students with opportunities they would have otherwise never had.

**References**

Cuban, Larry. (1986). Teachers and Machines: *The Classroom Use of Technology Since 1920.* New York: Teachers College Press.

Gateways to Better Education (corp. writer). (2002). *The Internet & Your Child* (Q&A). Retrieved October 22, 2006 from Gateways To Better Education: Keeping the Faith in Public Schools. ttp://gtbe.org/news/index.php/1/47/136.html

Haertel Geneva & Means, Barbra (Eds.). (2003). *Evaluating educational technology: Effective research designs for improving learning.* New York: Teachers College Press.

Hedges, L.V., Konstantopoulos, S., & Thoreson, A. (2003). Studies of technology implementation and effects. In G. D. Haertel & B. Means (Eds.), *Evaluating educational technology: Effective research designs for improving learning* (pp. 187-204). New York: Teachers College Press.

Learning Point Associates. (2004). Understanding the No Child Left Behind Act of 2001: Technology Integration. Retrived October 17, 2006 form North Central Region Educational Library. http://www.ncrel.org/tech/qkey3/goals.htm

Levenson, William. (1945). *Teaching Through the Radio.* New York: Farrar and Rinehart, p. 457.

Lloyd, Les (Ed). (2000). *Teaching with Technology: Rethinking Tradition.* New Jersey: Information Today.

Means, Barbara & Haertel, Geneva (Ed). (2004). *Using Technology Evaluation to Enhance Student Learning.* New York: Teachers College Press.

Moses, L. (2000). *A larger role for randomized experiments.* Paper presented at the invitational meeting: Building a foundation for a Decade of Rigorous Systematic Educational Technology Research, SRI International, Menlo Park, Ca.

Nilson, Linda & Weaver, Barbara. (2005). Laptops in Class: What Are They Good For? What Can You Do With Them? In Nilson, Linda & Weaver, Barbara (Eds.), *Enhancing Learning with Laptops in the Classroom* (pp. 3-14). San Francisco: Jossey-Bass.

Patore, Michael. (2001). *Computer, Net Access Standard for many Americans.* Retrieved October 18, 2006 from ClickZ Network. http://www.clickz.com/showPage.html?page=879441

Roblyer, M. (2006). *Integrating Educational Technology into Teaching.* Fourth Edition. New Jersey: Merrill Prentice Hall.

Saettler, Paul. (1968). *A History of Instructional Technology.* New York: McGraw-Hill, p.98.

Shellhammer, Ric. (2005). Television in the Classroom. Retrieved September 24, 2006 from San Diego State University. http://coe.sdsu.edu/eet/articles/tvclassroom/start.htm

Shipman, David. (1982). *The Story of Cinema: A complete Narrative History from the Beginnings to the Present.* New York: ST. Martin's Press.

Sutton, Bettye. (2005). American Culture History: 1930-1939. Retrieved September 24, 2006, from Kingwood College Library. http://kclibrary.nhmccd.edu/decade30.html#film

Thornburgh, Dick & Lin, Herbert (Eds.). (2002). *Youth, Pornography, and the Internet.* Washington DC: National Academy Press.

Yahnke, Robert E. (1996). CINEMA HISTORY: *Films from the Silent Era.* Retrieved September 21, 2006, from University of Minnesota. http://www.tc.umn.edu/~ryahnke/film/cinema1.htm

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