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The future of educational technology

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The future of educational technology

Abstract

Presents an overview of the role of educational technology. Inadequate teacher training, minimal technical support, limited money and time are seen as barriers to successful integration. The research involving each barrier is discussed, and suggestions are made for overcoming these barriers. The importance of classroom teacher is investigated. The current uses of educational technology are discussed as well as suggestions for the successful future use of educational technology. Concludes that technology will be partnered with education; the issue to be resolved by individual schools will be how to best use it to improve the educational process.

THE FUTURE OF EDUCATIONAL TECHNOLOGY

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Barbara F. Erlandson

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          Inadequate teacher training, minimal technical support, limited money
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          the educational process.

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CHAPTER ONE

Introduction

The acceptability and role of technology in the educational arena was investigated. Some people might say that our educational system is the only thing our ancestors would recognize if they reappeared today. Business, health care, financial markets, and many others have experienced the benefits of technology--ending traditional practices which would be recognized by our ancestors. Will this be true of education in the next century?

Educational technology

. . .is essentially a 20th century movement with the major developments occurring during and immediately after World War II. An emphasis on audiovisual communications gradually became focused on the systematic development of teaching and learning procedures which were based in behavioral psychology. (Ely, 1999, p. 5).

Technology is not new to education, but successful integration has not happened on a regular basis. Film, radio, television, and computers are all technologies which have promised to change the face of education forever. However, the backbone of education is still the traditional "teacher lectures, student listens" scenario.

The failure of technology to find overwhelming success in education has been attributed to the lack of: teacher training, technical support, money, and time. It is not fully understood at this point what it will take to make a complete shift from industrial-age to information-age education. Those who are predicting the future of educational technology say that "schools should expect

more integration, interaction, and intelligence from future technology"
(Mehlinger, 1996, p. 62). Technology thus far has been viewed as an extra to
be used when the real studying is done. Technology has not necessarily been
responsive to the learner's needs or customized to their learning style. Schools
and technology developers are seriously looking at ways to alleviate the
barriers to the successful integration of educational technology as we head into
the next century.

The purpose of this study was to investigate the future role of educational
technology.

<p align="center">RESEARCH QUESTIONS</p>

The following two research questions were used to assess the future role
of educational technology.

1. What areas of concern need to be addressed in order for educational
technology to become a more effective tool?

2. What increased role can technology play in education?

<p align="center">TERMS</p>

Technology (Information Technology): computers, software, internet,
video, radio, and television used as information management and delivery
systems in the educational arena.

CHAPTER TWO

A Review of the Literature

What areas of concern need to be addressed in order for educational technology to become a more effective tool? The areas which are mentioned frequently in the research are teacher training, technical support, money, and time.

Teacher Training

It is a fact that no change will be made in the classroom until the teacher becomes involved. As Chris Woolley (cited in Gold, 1999), principal at a Lawrence, N.J., middle school stated when discussing the implementation of technology into his school:

The reality is that technology itself will never make a difference

for kids. The real difference to kids will always come with

the teacher. So what we had to do was find out how to

bring the teacher into the picture so that the teacher was excited,

motivated, knowledgeable, energized, involved, because the

teacher is going to transmit all those things to the students.

Teachers need to be treated as respected professionals capable

of providing valid input in the decision-making which involves

educational technology. (p. 11)

Hope (1996) advised that it would not be a good idea to leave the decision about integrating computer technology up to the teachers or to force them to use the computer. He indicated that teachers are the key to schools using technology to its full potential and that five factors would increase their use of technology: ease of implementation, access to computer technology, collaboration, training, and sufficient time.

As schools develop training programs for teachers they need to work to eliminate the fear. Training needs to be provided not only in how to use the specific technologies available, but also in how to integrate technology into the classroom. This training needs to be developed not only for the veteran teacher, but also for the teachers fresh out of college as many colleges are not yet aggressively addressing the need for technical knowledge in their teacher education programs. Involving all teachers in a district in one generic technology inservice does not meet the needs of most of the teachers. Individualization of training for teachers is a must in order for the training to be successful. Schools have embraced the idea that instruction for students needs to be individualized to each student's specific needs and learning style, why not do the same for the teacher? As highlighted by Cooley (1997), Westfield Washington Schools in Westfield, Indiana, have implemented such an individualized training program and found it to be highly successful.

Meltzer and Sherman (1997) suggested "principals should provide a combination of traditional workshops, in-classroom collaborations, mentoring, conferences, and whole-learning residential workshops" (p. 23). Training needs to be an on-going process with follow-up sessions as well as introduction to new technologies.

Schools could learn from the business world's wisdom as far as training goes. Many have gone to just-in-time training. They are bringing the training right to the employee's workstation rather than having them travel to large classrooms. In business world training is not provided for a technology which is not available and ready to be used by the employee. Often teacher training is given on technologies which are not readily available to the teacher.

By the time the technology is available the specifics of the training have been forgotten.

<u>Technical Support</u>

"Human infrastructure is more important than the technological infrastructure" (Cooley, 1997, p. 28). Elisabeth Palmer (cited in Shaw, 1997) indicated "one particularly important resource for the development of teacher expertise in the use of educational technologies is on-site assistance from a full-time computer coordinator. Less than five percent of all schools, however, have such a full-time professional on staff" (p. 5.2).

An ideal situation would be to have several technology experts hired in a school district. The group's expertise would need to represent a diverse cross section of knowledge: software, hardware, training, research, curriculum. Currently most school districts expect staff members to troubleshoot their own technology problems and select their own technologies. Because teachers average about 10-15 minutes per day per class to devote to classroom preparation, most decide technology is the piece they can eliminate.

Conte (1998) points out "businesses generally assume that computer networks require one technology specialist for every 60 users. By that standard, schools would need the equivalent of one specialist for every two classes" (p. 20). The Westfield, Indiana, school district mentioned earlier (Cooley, 1997) hired eight employees to assist with technology. This number may be a bit high for many districts but "the message is that if district officials do not provide appropriate levels of support, teachers and administrators are unlikely to use technology" (p. 24). The bottom line is that teachers should be able to use technology in the classroom to improve learning, they should not be learning to

use technology in the classroom. A support person needs to be on hand to handle the troubleshooting and assist in the proper selection of technologies. Money

Not all technology is expensive, but when integrating technology into the curriculum it needs to be realized that the hardware is not the only thing in the budget. "No more than 50 percent of the total information-technology budget should be spent on hardware: 30 percent should be spent on software, and at least 20 percent should be spent on support" (Reinhardt, 1995, p. 2).

Schools have limited budgets to devote to technology so partnerships need to be formed with local business for purchasing support and with educational institutions for training. There may be opportunities for grants to schools which should be investigated by the districts grant writer and/or curriculum director. Money will be "found" when schools decide they want technology fully integrated into their curriculum badly enough to pay for it. There is not an inexpensive solution to integrating technology. Technology is expensive not only to buy, but also to maintain.

Technology will be an on-going expense in districts. Unlike textbooks, educational technology is changing constantly. Schools need to budget for upgrading on a continuing basis.

Snider (1996) offers a solution which could be seen as threatening to teachers. Snider indicates that education has "the worst productivity record of any major economic sector in the United States" (p. 7) and he suggests that education will move from a monopoly to competition. "For example, today's 40,000 Algebra I teachers could be largely displaced by a handful of star teachers working nationally"(p. 10).

Maybe the solution to the money problem most districts are facing will not
be to find more money, but to completely change the way the current money in a
district is spent.

Time

Ball State University, Muncie, IN, has started a partnership with its local
schools to help offer opportunities for training in educational technology
(Smith, 1999). In Indiana colleges juniors and seniors can qualify for substitute
teacher licenses. These students then go out into the school for an unpaid
practicum experience while the regular classroom teacher is allowed to attend
university sponsored technology workshops. "This is a win-win situation.
Students gain valuable classroom experience, supervised by our clinical
adjunct faculty and professional development faculty in partnering schools, and
teachers in these schools are partaking of valuable learning opportunities
during their regular workdays" (Smith, 1999, p. 15). Meltzer and Sherman
(1997) suggest that it takes three to six years to fully implement new technology
and that training cannot be a one-time shot, it needs to be ongoing.

Exciting goals for technology which would increase classroom contact
time with students for teachers were outlined by Bennett (1996):

When computers are fully used in schools, human instructors will no

longer have a grade or a class assigned to them; they will not

relay academic information to students by lecturing, assigning

readings, showing films or audio visual displays; they will

no longer be forced to make daily lesson plans and the

routine preparations for classes that now weigh upon them;

they won't have to devise and correct tests; their paperwork will

almost be eliminated; it will not be their responsibility to cover

a specific section of curriculum over a given time; they won't be obligated to produce marks, nor make the painful decision whether to pass or fail borderline students. (Chapter 18, p. 3)

Elimination of all of the highlighted routine tasks will give teachers the time they need to personalize instruction and help students understand the vast amount of information available. Thus, "computers will use their unique power to instruct and enlighten, teachers, will use their humanness to educate and uplift. . . .computers will instruct; teachers will educate" (Bennett, 1996, Chapter 18, p. 8).

The question of time could also address the time found in the classroom for the use of technology. Cuban (1986) predicted elementary teachers would use computers in 10 percent of the weekly instructional time and high school teachers 5 percent. Students in most schools have access to computer technology for only a short time each week. "Imagine the outcry if students had access to a textbook only one day a week or if they had to share a pencil with 15 other students" (Mehlinger, 1996, p. 68).

The areas of teacher training, technical support, money, and time are of equal importance as schools work to integrate educational technology into the curriculum. The best ways to use technology are just being discovered, but we do know "educational technology can facilitate the teaching and learning process and potentially make education richer and more stimulating by creating environments and presenting content not possible otherwise" (Thompson, Simonson, Hargrave, 1992, p. 68).

What increased role can technology play in education? A review of the literature reveals dreams which range everywhere from minor changes in the traditional classroom to major changes in the entire educational system.

Rodrigues (1997) states "the evidence shows that technology has not yet delivered on the promise to education. But I think it also shows the potential is there if we are willing to do it the right way" (p. 104). Of course, there are differing opinions on what the right way should be.

Thomas (1994) suggestd "the greatest service technology can render to education lies in communication and curriculum" (p. 13). The educator's idea of the school day would have to change as Thomas is suggesting communication with students outside of the regular school day and curriculum conveyed and constantly updated via the computer. He suggested that education will not happen in a designated place at a designated time. Post-secondary education is already offering web-based classes and Thomas believed this may be the proper delivery system for education at all levels. Perelman (1992) agreed with the suggestions of Thomas when he stated, "Bolder editorialists may begin to speak of classrooms without teachers, schools without classrooms, or ultimately even education without schools" (p. 63). Snider (1996) followed this line of thought when he suggested that education of the future will not be bound by borders. Students will learn on a national level not only from textbooks but also from "virtual classrooms", "virtual courses", and "virtual schools".

Textbooks as the main source of information in the classroom are being challenged. Wishengrad (1999) reported on the work of many of the major computer companies to replace textbooks with computers. Schwartz (cited in Wishengrad, 1999) stated "students can use computers to reach hundred of telecommunications networks, and these sources provide a huge amount of information that students cannot get from textbooks and more traditional learning tools" (p. 8). On the other side, Oppenheimer (cited in Wishengrad, 1999), author of the study "The Computer Delusion" printed in the Atlantic

Monthly in 1997, indicated that the textbook was challenged by technologists of the past: Edison (inventor), thought the motion picture would replace the textbook; Levenson (educator), believed in the radio receiver; and B.F. Skinner (psychologist), put his faith in the teaching machines and programmed learning. On the other hand, Oppenheimer stated "while computers and technology for students would appear to have benefits, I believe the opposite is true due to the ability of computers to curtail students' own creativity. Textbooks better stimulate kids to create their own stories and open up their imagination. . . " (p. 16) Maybe electronic books will be the happy medium in the textbook debate. Electronic books allow readers to easily highlight parts (highlighting is not normally allowed in books owned by the school district) and even look up unfamiliar words with the click of a mouse. Electronic books allow greater interaction with the printed media for the student.

Many who have been educated in the traditional classroom would encourage schools to find a way to keep the human element in education. The general feeling is that the teacher will still be needed to keep the student on task and to help them process the huge influx of information. Mehlinger (1996) indicated that we cannot ignore the computer as a powerful presenter of information. He indicated that teachers will still be an important part of education, but their role will change from a presenter to a facilitator.

Education will be changing at all levels. Drucker (1998) suggested that the greatest changes in education may be at the post-secondary level:

Long-distance learning, for instance may well make obsolete within 25 years the uniquely American institution, the freestanding undergraduate college. . . .The center of gravity in higher education (i.e., post-secondary teaching and learning)

may shift to the continuing professional education of adults

during their entire working lives. This, in turn, is likely to move

learning off campus and into a lot of new places: the home,

the car, or the commuter train; the workplace, the church

basement, or the school auditorium where small groups can

meet after hours. (p. 19)

Technology may also be used in the future to give schools better quality

control. Upbin (1999) highlights technology which will give "schools better

quality control--knowing which instructional techniques work and when" (p. 2).

The Advantage Learning Systems (ALS) Accelerated Reader software which

tests reading comprehension was discussed in the article. This software gives

instant feedback to teachers and parents and enables students to get the help

they need much sooner than traditional reading tests. Immex software which

creates computer-based simulations for science students to improve their

diagnostic skills was highlighted as improving a student's ability to analyze

rather than guess. National Computer Systems software has many components

which will help improve quality control in schools. This software makes

scheduling a short process, matches classroom lessons to state standards, can

generate test items for assessment, and allows parents Web access to their

child's assignments. All of this software promises to "improve output in the $300

billion K-12 education industry" (p. 30).

As schools work to integrate educational technology we need to keep in

mind Postman's (1995) question, "what they [the students] will lose, and what

we will lose, if they enter the world in which computer technology is their chief

source of motivation, authority and, apparently, psychological sustenance"

(p. 16). He goes on to say "what we needed to know about cars--as we need to

know about computers, television, and other important technologies--is not how to use them but how they use us" (p. 19).

CHAPTER THREE

Conclusion

As stated in the introduction, the acceptability and role of technology in the educational arena was investigated. The research indicates there are many things (e.g. provide information, manage data, simulations) in education which machines can do better. Mehlinger (1996) stated "no teachers will be replaced by a machine unless they attempt to do only what the machine can do better" (p. 19).

> Shields (cited in Cerami, 1996) of the University of Virginia stated:
>
> There is also a simple reason why schools have remained
>
> stuck in the old ways of teachers, blackboards, and
>
> books. It works. Anyone who has been inspired by a great
>
> teacher already knows this. And anyone who has curled up
>
> with a great novel knows that old-fashioned printed words
>
> can inspire imagery and emotion beyond even the most
>
> sophisticated multimedia or virtual reality software. (p. 6)

> Thompson, Simonson, Hargrave (1992) summarized their findings by saying:
>
> Educational technology provides ways of efficiently and
>
> effectively storing and delivering instructional messages;
>
> however, the technology, in and of itself, does not directly
>
> impact learning. Rather educational technology can
>
> facilitate the teaching and learning process and potentially
>
> make education richer and more stimulating by creating
>
> environments and presenting content not possible otherwise. (p. 68)

The conclusion derived would be that nothing will be able to replace the power of the master teacher equipped with the best tools. Make training and technology available to teachers and they will be able to use technology to eliminate the mundane tasks as well as to enrich the educational process.

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