Does Technology Reform Education?

Connie Courbat

University of Northern Iowa

Copyright ©1998 Connie Courbat
Follow this and additional works at: https://scholarworks.uni.edu/grp

Recommended Citation
https://scholarworks.uni.edu/grp/1555

This Open Access Graduate Research Paper is brought to you for free and open access by the Student Work at UNI ScholarWorks. It has been accepted for inclusion in Graduate Research Papers by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.
Does Technology Reform Education?

Abstract
School reform initiatives have been part of public school change for some time. In the past two decades, this author has participated in implementing several educational changes within a public school classroom. Some of these changes have involved learning new teaching strategies, integrating technology into the curriculum, implementing new concepts such as whole language, and participating in workshops to learn about "new" educational topics.

Often these change efforts were embraced by educators as new and innovative ways to help students learn. However, many of these changes were tried and discarded because no ongoing effort was made to incorporate them systematically into the school organization, ongoing support for further training was often absent, and resources to implement changes were not adequate. Within many educational environments these changes were referred to as "fads" because of their short term effects on the educational system and teaching behaviors.
Does Technology Reform Education?

A Graduate Review
Submitted to the
Division of Education
Department of Curriculum and Instruction
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

UNIVERSITY OF NORTHERN IOWA

By
Connie Courbat
Summer, 1998
This Review by Connie Courbat

Titled: Does Technology Reform Education?

Has been approved as meeting the research requirement for
the Degree of Master of Arts in Education.

Sharon E. Smaldino
Graduate Faculty Reader

Robert Muffoletto
Graduate Faculty Reader

Robert Muffoletto
Head, Department of
Curriculum and Instruction
Table of Contents

Chapter
I. Introduction ....................................................................... 1.
   Problem Statement .......................................................... 3.
   Research Question .......................................................... 6.
   Definitions ........................................................................ 6.
   Methodology ...................................................................... 7.

II. Review of Literature .......................................................... 9.

III. Conclusions ..................................................................... 21.
   References ......................................................................... 27.
Chapter I

Introduction

School reform initiatives have been part of public school change for some time. In the past two decades, this author has participated in implementing several educational changes within a public school classroom. Some of these changes have involved learning new teaching strategies, integrating technology into the curriculum, implementing new concepts such as whole language, and participating in workshops to learn about "new" educational topics.

Often these change efforts were embraced by educators as new and innovative ways to help students learn. However, many of these changes were tried and discarded because no ongoing effort was made to incorporate them systematically into the school organization, ongoing support for further training was often absent, and resources to implement changes were not adequate. Within many educational environments these changes were referred to as "fads" because of their short term effects on the educational system and teaching behaviors.
From the 1957 launching of Sputnik to the current cry that our students will not be prepared for the 21st Century, public education has been criticized. Groups such as the general public, business, government, religious, and special interest (to name a few) claim that what is wrong with public schools is the fault of public school teachers and the public education system. Despite the variation of critics, the common message is public schools need to make significant changes in what is happening in them.

Society currently is in the midst of the Information Age and once again public education is facing another opportunity to embrace reform. Technology has permeated our culture in every aspect.

According to Muffoletto (1994a) technology is more than access to information and learning experiences. “Technology determines the nature of the information as well as our understanding of it. As a medium of experience, technology effects our consciousness, our visions, and our expectations” (p.52).
Politicians even agree that technology will play a role in educational reform. According to Hestnes, (1997) President Clinton announced in February of 1997 that one of the major initiatives of his second term was to fulfill the promise of having computers installed in every U.S. public school and ensuring that each of the schools have access to the Internet. For politicians, the Internet in every classroom has become the modern equivalent of the promised “chicken in every pot,” and is currently quite fashionable (Dede, in press).

Educational Technology is perceived as a major vehicle in the movement toward educational reform (Plotnick, 1995).

The Problem Statement

Education is being bombarded all on sides by many different constituents demanding that improvement be made in the entity called public education. The challenge has been laid at the feet of educators and public school systems.

As an educator from a public school district whose school has been recognized as a leader in technology, this author finds that status quo is alive and well.
Technology in the form of computers, school wide networks, distance education applications through the Iowa Communications Network (ICN), and Internet access is abundant in all parts of the school.

Students have easy access to all technology, but despite all of this, educational paradigms have remained static with relationship to teaching and learning. The educational system and its day to day operations are traditionally similar to a time before technology appeared. Didactic instruction is the norm. The school model of the Industrial Age is alive and well.

According to Reigeluth (1992) educational systems can be compared to transportation systems. Like the one-room schoolhouse, the horse was suited to the Agrarian Age. The horse was highly flexible and individualized. When society evolved into the Industrial Age, the transportation needs changed. It was necessary to haul large amounts from factories. Rather than trying to improve the prevailing system, a new paradigm was developed in the form of a railroad.
“The need for a new paradigm of education is based on massive changes in both the conditions and educational needs of an information society.” (Reigeluth, 1992, p. 10.) According to Reigeluth (1992) the Information Age has made a new educational system necessary, but has also made it possible because of new information technologies. We now have available powerful tools to help facilitate this paradigm shift.

In the current educational system, islands of innovation are occurring. They are at best sporadic efforts at reform. The organization of the school system has not changed for true innovation to be long lasting, meaningful, and sustainable.

Educational uses of technology must be more than islands of innovation taught by a few educators who believe that technology has the potential for reshaping the educational system. Most educators who use technology to implement the alternative types of pedagogy and curriculum are "pioneers": people who see continuous change and growth as an integral part of their profession and who are willing to swim against the tide of conventional operating procedures (Dede, in press, p.6) It is time to change the way public schools operate and create whole schools of pioneers.
Research Question

What systemic changes will need to occur for technology to successfully impact lasting educational reform?

Definitions

Agrarian Age--A period of time pertaining to agricultural or rural matters.

Computer literacy---A knowledge base concerned with learning about computer basics.

didactic teaching---A teaching strategy in which learners are passive and spend the majority of time listening to the teacher lecture.

educational reform---An education plan carried out for the purpose of making changes within the educational organization to remove faulty teaching practices or educational policies.

ICN----The ICN stands for the Iowa Communication Network. This is a network of schools, hospitals, and libraries that are connected via fiber optics and these rooms serve as distance education opportunities for communities within the state of Iowa.

Industrial Age--A period of time in which society produced products in masses.

Information Age---A period of time in which society values and utilizes information.

integration---To bring a new idea, product, or topic into an existing organization and the changes resulting from this introduction.

Internet-- A network of network where computers are connected to sources of information.
innovation---A new idea that is creative and causes a change in organizations or procedures.

paradigm---A person's way of understanding and organizing things in their environment.

systemic change---A paradigm shift which entails a fundamental change in the way an organization or person operates.

technology---Any device available for use in instructing students in a more efficient and stimulating manner.

Methodology

The topic of technology's role in school reform has been of interest to this author for a long time. As a veteran teacher who is very involved with the site-based decision making process and a member of the district technology team, this author has always believed that we were only reaching the tip of the iceberg when it came to integrating technology into our curriculum and restructuring the way we teach and students learn.

Imagine for a moment that a district is a huge lake of water. Surfacing out of the water are islands that represent innovative teachers who use technology.
These islands are scattered all over the district, but if an innovative teacher leaves the district it is analogous to the island sinking and the learning with and about technology forever lost.

The innovation is tied directly to the individual teacher rather than embedded systemically in the normal day to day operations of the school district.

There lies the concern that is the focus of this paper.

The paper reflects a literature review over related topics with respect to school reform and technology’s impact in causing schools to reform. An extensive review about school reform was completed and then journal articles that focused on how technology fit into a framework for school reform were identified. The review included journal articles, related textbooks, and online information on the Internet. Over 40 sources of information were reviewed along with five textbooks, and then the ones that pertained specifically to school reform and the use of technology in public schools were identified.

Having seen first hand how technology use can disappear as pioneers travel on, this author is interested in learning what needs to change within an educational system in order for technology to successfully impact learning.
Public education historically has had difficulty encompassing change. As Mehlinger (1995) stated lack of vision hinders the reform movement. The hardest step to educational reform seems to be the part that costs nothing which is a vision (Thornburg, 1989).

Three major areas of educational change have occurred over time. These areas included the establishment of public education, changes that occurred in the post-Sputnik era, and the introduction of computer literacy into the curriculum (Besser, 1993). The establishment of schools was viewed much as the establishment of factories in the Industrial Age. They were supposed to be symbols of progress that would bring economic health to a community (Besser, 1993).

School reform movements throughout history have always required some larger social justification. Our reforms must be aimed at maintaining national defense, beating the Russians to the moon, and currently improving our competitive position with economic rivals (Besser, 1993; Mehlinger, 1996).
Educational reform was attempted with two distinctly different paradigms. Reform was considered to be either top down or bottom up. Besser (1993) suggested that proponents of top down reform were dominated by business and political leaders. They saw school as agents of society and that school reform was necessary for a strong economy. They believed that if schools didn’t change, America would become weaker.

Another perspective of reform came from educators such as John Goodlad, Ted Sizer, and Robert Slavin. They were interested in reform that centered on what was best for students and teachers. They believed that school reform would not be accomplished by federal mandates. It would happen school by school and classroom by classroom.

In 1983 the report called “A Nation at Risk” prompted reform initiatives that included longer school days, longer school years, more testing of students, additional rigorous graduation requirements, tests and career ladders for teachers, and merit pay. (Campoy, 1992; Gonzales & Robyler, 1996; Mehlinger, 1995; Muffoletto, 1994b).
This report led to another round of blame for the system and teachers. Small incremental changes were made in some schools, but these changes were seen as superficial fixes for an educational system that seemed broken and wasn’t meeting the needs of students.

A fact that was often forgotten amid reform was that the system was meant to educate the masses. The system educated a larger majority of students in America than in any past history.

The next wave of educational reform centered around the drive to establish national goals and standards. With national standards, schools and teachers will be made more accountable because everyone will be teaching essentially the same content, and the public will be better informed by the results (Besser, 1993).

Often educators are asked to address 21st century issues concerning teaching, learning, and management with a system designed from the Industrial Age (Gonzales & Robyler, 1996). We require a different kind of school, one that focuses not on mass production, but one providing each child with the best education possible (Besser, 1993).
In addition to the varied reports about the state of public education, a major impetus for continued efforts at reform dealt with the introduction of the computer into public education in the early eighties. This movement toward teaching about computers in schools was not based on a concrete need for people to learn about computers to become well functioning members of society. People who were buying computers were not quite sure what they would use them for (Besser, 1993). With computers invading society at a rapid rate, educators began the process of adding computers to the school.

According to Bork (1993) computers entered educational systems in stages. The first stage was let us get lots of hardware. Schools needed to gain visibility with the public that they were incorporating a machine that everyone felt would redefine education. However at this stage no one had a clear idea of what to do with computers. Boyer (cited in Snider, 1992) of the Carnegie Foundation for the Advancement of Teaching said that technology revolutions have failed to touch the schools largely because purchases frequently have preceded planning, thus adding prestige to the school but with little educational value.
Educational organizations purchased technology first and then decided how to use it later (Levinson, 1990).

After schools had the hardware there was an urgent need to do something with these computers. Educators had no defined goals for using computers, so they decided to teach computer languages and computer literacy. Computer literacy was among the most popular concept in the eighties even though no consensus existed on what it was (Gonzales & Robyler, 1996). Computer literacy is like motherhood in that most people are in favor of it. But unlike motherhood, it does not have a clear and precise definition (Bork, 1993).

Computer-based technologies have been brought into schools during the past decade largely because the technology was seen as important in and of itself because it was an increasingly central component of the world of adult work (Shiengold, 1991). As more jobs include computer usage, the community continued to want the inclusion of computers in the schools (Campoy, 1992).
An issue that should have been addressed before computers arrived in schools was the issue of teacher training. According to Dede (cited in O’Neil, 1995) one of the mistakes that was made in implementing educational technology was focusing first on students rather than teachers.

Many educators feared computers and resisted teaching with them. The teacher must decide whether or not to teach with a computer. Teaching with a computer requires not only a degree of technical proficiency but also the acceptance of a decidedly different role (Hannafin & Savenye, 1993). According to Cuban (1986) teachers altered their teaching practices when a technological innovation helped them do a better job of what they already decided had to be done, helped them solve problems they defined as important, and if this technology innovation did not erode their classroom authority. Cuban (1986) found that continuity rather than change characterized teacher practices when using new technology.

Cuban (1986) also stated that “limited use of new technology may be due to organizational constraints built into classrooms and schools as workplaces” (p. 81).
The system is set up for the teacher to handle a given number of students for a prescribed amount of time. In addition they must maintain order while inspiring the class to learn content and skills mandated by the community. Over time teachers have adapted to this system by developing a set of skills and methods that became the classroom pedagogy and school and classroom structures have influenced this.

As schools were just getting a handle on some of the issues and problems associated with putting computers in schools, technology advancements were progressing at a faster rate. Educators were still learning the basic fundamentals while the technology was exploding into new areas. Now more powerful equipment was available. So educators once again focused on accumulating additional hardware. Instructional issues took second place and most students once again were unaffected by this advanced hardware. Most classes in public schools continued as they were before computers. If we always precede by jumping on the bandwagon of the latest device, the computer will never have any major effect on education (Bork, 1993).
The next phase of learning about technology was to develop small programs to fit into courses we already teach. If the computer is to affect education significantly it must be used in subject matter areas. These programs were simple and students were finished with them in a relatively short amount of time, so most courses were altered slightly (Bork, 1993). Also some of the programs that educators used had nothing to do with the curriculum of a school, but they used them because they were available and students had fun using them.

Educators tried to use authoring systems to no avail. These programs cost a lot of money and were inadequate because of the nature of the learning process (Bork, 1993).

An early success for computer usage arrived when educators decided that the computer was a viable tool in areas such as using word processors for writing. Educators focused on teaching students to use word processors, spreadsheets, and data bases.

This stage of history according to Bork (1993) is referred to as the “picking up crumbs from the business table” (p.85).
School districts then moved on to installing networks and connecting all the computers within the system. Local area networks were set up and educators began using e-mail and bulletin boards to communicate with one another (Bork, 1993). At the same time management software was entering schools and teachers found useful time saving strategies with software that allowed them to enter data about their students.

This brings us up to the current period of history. According to Bork "we have not reached the desirable final stage for the effective use of computers within the classroom environment" (p. 89). Public institutions have a varying degree of hardware and software, but clearly we still are pioneers in our use of this technology. Educators are struggling with many issues related to integrating technology into school curriculums. Some of these issues cover the topics of infrastructure, school revenues for technology, time, resources, and inadequate training.
According to Sheingold "the successful transformation of student learning will require the bringing together of three agendas of reform: an emerging consensus about learning and teaching, a movement toward well-integrated uses of technology, and the push for restructuring" (1991, p.17).

Reform efforts have not accomplished giving us an improved educational system and a new plan is needed. The term restructuring refers to a more indepth look at the way a school is organized for learning. According to Muffoletto (1994b) "restructuring typically refers to a new or different configuration, a moving of "things" around within a given arena with one eye on the past and one eye on the future" (p.25). These changes may be as diverse as reorganizing a school’s schedule, developing new assessments, or creating ungraded classrooms to mention a few (Shiengold, 1991).

If the present system is failing to produce the type of educated students that the nation needs, then automating those same processes will not change the educational outcomes. The present structure of schooling militates against change (Collins, 1991).
The restructuring movement proposes change which does affect the quality of learning. Restructuring calls for the creation of innovative practices to promote personalized education (Campoy, 1992).

What seems perfectly clear to all interested stakeholders who want to preserve the system of public education is that technology is here to stay and the current educational system won’t allow for changes that are truly long term, sustainable, and innovative which prepare students for the 21st century. According to Thornburg (1989) we are continuing to support an educational system that perpetuates models that are ignorant of both technological advances and the fact that our world is growing increasingly complex.

According to Adams & Hamm (1987) “revitalizing American schools requires teachers who understand how to exploit instructional technology as a teaching tool. Giving technology-based education a central and contributing place in the educational planning process is an important dimension of school reform” (p. 61).
Perelman (cited in Hannafin & Savenye, 1993) argues that visions of restructured schools should drive the use of technology, not vice versa. Changes in teaching and learning are necessary before changes in technology can be integrated.

Good classroom tools extend the teacher’s power to create a rich learning environment. Computers are wonderful tools. But teachers are not yet prepared to use them well. Technology can help change the nature of teaching and learning, but only if teachers understand it, accept it, and use it (Solomon, 1992).

In order to use technology to support fundamental change in the organization, it needs to be integrated into all parts of the organization; school governance, assessment, and instruction. School districts have not been very well organized to leverage technology’s potential to reform teaching and learning (Goldberg and Richards, 1995). According to Levinson, Doyle, & Benjamin, (1993) it takes a skilled educational leader to introduce technology-based change in a school. “But in our work with schools that are using technology to increase educational productivity, we have discovered one important axiom: Technology introduction is instructional change is organizational change” (p. 22).
Chapter III
Conclusions

Technology represents a hope for the future of public education. These technological devices have the potential to re-energize teachers and students and create learning environments that depend on the educational system to look differently than it does presently. Systemic change needs be made if the full potential of technology is to be utilized. Cuban (1986) has led educators through the history of the use of teaching machines and shared that as far back as 1920 teachers experimented with technology. Whether it be radio, film, television, or computers; limited use of this technology was the result of organizational constraints built into the educational system.

If technology is to impact educational reform, systemic change needs to occur in several areas of the educational organization. Systemic change will require substantial changes in what schools look like and how they function. Some of the areas educators need to explore to bring about change include decision making processes, time constraints, class groupings, changes in the role of the teacher, instructional strategies and methods, and the use of technology.
Each of the topics listed represent an opportunity to dialog about how schools could be improved. This change will be slow and thoughtful. According to Cuban (1986) the challenge to those deeply committed to school improvement need to realize that continuity and change are interwoven in the schooling process.

One thing that is certain is that change is occurring. The educational community can be open to changing the educational system, or society can leave the system behind as no longer useful just as the horse was left behind as a mode of transportation in the Industrial Age.

Technology is often seen as a catalyst for change. This is evident in the area of access to information. The amount of information available to students today is more than a teacher could ever acquire and share. Educators have an opportunity to integrate technology into the learning process as a tool to utilize available resources. Technology is part of today’s society and we must not ignore its potential.
In the following paragraphs are scenarios depicting what a school environment could be like if systemic changes occurred in an educational system. For example, imagine a child who moves through the system without being assigned to a grade. The opportunities for multi-age learning would abound. The student would move through the system based on his or her learning goals rather than being taught in a large group of age-like peers.

The educational facility would no longer consist of classrooms where a teacher is assigned a certain number of students to teach. The building would be made up of work stations where students moved as their work demanded. Information would be abundant because of the technological advances. Students would be able to access any information from any spot in the school and from different locations within the community.

Learning is no longer passive, but rather student driven. Students become autonomous learners directing their own learning. Teachers would have an important responsibility in assessing the skills students acquire. The teacher would monitor the acquisition of skills as students worked on self-directed projects.
The role of teachers would drastically change in the new system. No longer would their role include being the “sage on the stage,” but rather that of a facilitator. The teacher would no longer hold information to disseminate to students, but rather guide students to resources to gather information.

Teachers would no longer be isolated within the confines of one classroom, but would be seen as experts to be consulted with anywhere within the system. With multi-age groupings teachers would help any student within the system.

Time would no longer be an issue regulated by the clock and eight period days. Students would work on projects without worrying about time. They would no longer be interrupted by a bell telling them to exit an area of interest because it is now time for math. Subjects would all be integrated within the learning opportunities and there would be no need for separate classes.

The above examples highlight what might be possible if the system changes. However before this kind of educational change can occur, educators must look back at the past and carefully look at what did not work. Stakeholders in a given educational community must have a vision for their school.
They must consider the future of public education and design educational systems which incorporate the best teaching practices from the past with new learning. Educators must be bold with education initiatives. They must dialog with each other, set goals for future learning, and create environments that are innovative and excite learners to excel.

We are at a crossroads with integrating technology into our curriculum areas. We can continue to make incremental changes within a system that creates obstacles to its use, or we can truly make systemic changes which benefit all learners and create exciting opportunities for future learning.

According to Robyler (1996) "the focus of technology has shifted from the possible impact of a product or method to how technology can help teachers change key aspects of the teaching and learning environment, whether it be their interactions with students, the ways a classroom functions, or the unique kinds of learning experiences they can make possible by employing certain technology resources" (p.12).
Adams and Hamm (1987) suggest that technology is both part of the cause and part of the solution. "With or without educators, it’s going to change the educational equation. If teaching professionals do not have the ability to take their share of control over learning and related technologies, there are others waiting to do it for us" (p. 63).
References


