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## Instructional Technology in the School System

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## Instructional Technology in the School System

### Abstract

Analyses of the deployment of technology in schools have tended to note its failure to affect the daily values and practices of teachers and students. This absence is generally regarded as an implementation failure, or as resulting from some temperamental shortcoming on the part of the teachers or technologists. Such a construction is predicated on the assumption that the technology is value free and its implementation a struggling playing field. This paper proposes that no instructional technology is ever neutral. Its value and practices must support the organization into which it is placed. The failures of technology to look and feel like school practices frequently result from a mismatch between the values of a school organization and those values that are embedded within the contested instructional technology itself.

INSTRUCTIONAL TECHNOLOGY IN THE SCHOOL SYSTEM

A Graduate Literature Review

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Division of Communications and Training Technology

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by

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## ABSTRACT

Analyses of the deployment of technology in schools have tended to note its failure to affect the daily values and practices of teachers and students. This absence is generally regarded as an implementation failure, or as resulting from some temperamental shortcoming on the part of the teachers or technologists. Such a construction is predicated on the assumption that the technology is value free and its implementation a struggling playing field. This paper proposes that no instructional technology is ever neutral. Its value and practices must support the organization into which it is placed. The failures of technology to look and feel like school practices frequently result from a mismatch between the values of a school organization and those values that are embedded within the contested instructional technology itself.

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CHAPTER I  
INTRODUCTION

Background

Trends indicate that schools need to make greater use of instructional technology. Such technology is available for practically every subject in the schools of today. The instructional tools will not take the place of the teacher or textbook, but will compliment the textbook and teacher in providing more effective teaching. Many schools are planning instructional technology programs to include: trained administrative personnel, separate budgetary allowances, in-service teacher training, and better equipment and materials (Parker, 1950).

Saettler (1968) stated, using the physical science concept, the definition of instructional technology, means presenting instructional material with the use of engineering technology, such as tape recorders, television, and projectors. Also, Saettler reported that school systems have long been resistant to needed reform and change. The role of the teacher has changed little. The typical teacher has 13 to 20 learners, in a conventional classroom, and the textbook is still at the center of classroom activity.

Haas (1960) said there has seldom been so much misconception and erroneous thinking on any educational subject as there has about the use of instructional

technology. The most important elements in building an instructional program are objectives and goals; what is the instruction suppose to accomplish.

Cuban (1986) noted as part of their occupational culture, teachers have built informal criteria for what will and won't work in their classrooms. These criteria by which teachers judge what is productive are embedded in an ethic of practicality. While teacher responses change over time as their beliefs alter and as they react to different surroundings, marginal alterations in practice can be identified over time.

In a study in the Chicago area public schools, Daft and Becker (1978) found that various technological changes, particularly those relating to the task scope of schools, seemed to flow upward from teachers to administrators. Teachers tended to be most aware of educational problems, as well as innovative solutions, and they often suggested technical changes that addressed those problems. Not surprisingly, the upward flow of proposed change from faculty to administration was associated most frequently with the successful adoption of technical change, within the school.

Cuban (1986) stated those that enter teaching are usually young people who are already favorably disposed to schools, acknowledge the limited financial rewards, seek



contact with children, appreciate the flexible work schedule, and embrace the service mission built into teaching. Recruitment and selection, then, bring into the profession people who tend to reaffirm, rather than challenge, the role of schools, thereby tipping the balance towards stability rather than change. Teaching itself nourishes a cautionary attitude toward change and an arms-length response to automated devices.

Milone (1996) believes that most successful implementations of instructional technology in education were usually the result of a commitment made by a teacher or a small group of educators. For applications of technology to be successful, there must be a clear purpose that is directly linking it to the curriculum. Also, implementing technology in education does not mean that the role of the teacher will be diminished. The teacher will play a active, though different, role in the classroom.

According to Sandholtz, Ringstaff and Dwyer (1997) there are key conditions necessary for technology to have a productive influence on teaching and learning. The key conditions are that teachers need to evaluate and change their beliefs about learning, technology should be viewed as one tool among many integrated into a meaningful curricular and instructional framework, teachers need to work in contexts that support risk taking and experimentation, and

technology can serve as a catalyst for change. Technology integration should be viewed as a challenging long term experience.

According to Garmer and Firestone (1996) with the demands for new skills and knowledge confronting individuals on a daily basis, it is clear that old models of classroom based training will not suffice. Students need more flexible learning environments that accommodate individual circumstances and styles of learning, luxuries the traditional classroom setting usually does not afford. Communications and information technologies are essential tools for adapting to a changing world.

Fisher, Dwyer and Yocam (1996) stated the general context of thinking about technology as a learning tool continues to change with remarkable rapidity. The passing of a single decade has seen great changes not only in the numbers and kinds of technological tools that are currently being used in classrooms and schools but also in the kinds of tools that may become available in the future. The leading and trailing edges of technology are diverging with breathtaking speed, and schools are increasingly faced with new risks and opportunities as they attempt to plan and implement programs using technology. New technologies appear to be influencing how ideas are represented communicated, stored, and interpreted.

### Summary

Instructional technology is beneficial for several reasons. However, the research suggests that instructional technologies have not always been effectively used in conjunction with teaching. This chapter has noted that instructional technologies can be helpful, if used correctly in an instructional program. Modern learning focuses on the learner and how to relay the instructional objective, in the best possibly way.

### Purpose

The purpose of this study is to examine the use of instructional technology in the teaching environment.

### Significance

This study represents an effort to investigate the differences between teaching with verbal communication versus verbal communication in conjunction with instructional technology, in the classroom.

### Research Question

Why is a teacher's use of instructional technology limited, even though instructional technology has progressed and developed, for many years?

### Definition

For the purpose of this paper, instructional technology will be defined as any device available to teachers for use

in instructing students in a stimulating and efficient manner than the sole use of the teacher's voice.

#### Organization of the Remainder of the Study

This study examines the teacher's use of instructional technology, in the classroom. Chapter II summarizes the methodology. Chapter III is a discussion on the literature related to historical developments, evaluation, issues and changes in the field of instructional technology. Chapter IV provides a conclusion.

## CHAPTER II

### METHODOLOGY

The method of identifying and locating sources, pertaining to instructional technology in school systems had been done through a series of events. Research had been conducted through a variety of classes, including Readings in Media, Studies in Media and a Seminar class. The reasoning for selecting the sources, which were analyzed, was to provide the history of instructional technology, changes which occurred and evaluation of uses pertaining to instructional technology in conjunction with teaching in the school system. Selecting sources was based on material about instructional technology and education, administering instructional technology, computers in schools and the meaning of instructional technology change.

CHAPTER III  
ANALYSIS AND DISCUSSION

This study examines the use of instructional technology in education. The review of literature provides the following summary:

- (a) historical developments of instructional technology,
- (b) evaluation of use and value of instructional technology,
- (c) advantages, issues and changes pertaining to the widespread use of instructional technology.

Historical Perspectives

Saettler (1968) reported the visual instruction movement, later called audiovisual, in American education, first developed from the mainstream of instructional technology during the years 1918-1924. An investigation of the literature with regard to instructional technology reveals four components related to historical developments: (a) credit courses in visual instruction were offered in colleges, (b) visual instruction professional organizations were founded at local and national levels, (c) professional visual instruction journals appeared, and (d) systematic visual instruction research studies were reported.

According to Saettler (1968), there is no simple answer why the visual instruction movement evolved. A number of factors combined brought about the visual instruction

emergence including the revolt against verbalism in education, the development of a rationale which attached unique qualities of concreteness to the use of certain visual materials and the growing conviction that the film was destined to revolutionize educational practices.

Cuban (1986) stated, between 1907 and 1911, teachers were talking approximately 64% of the time and students the remaining time with short-sentence responses. Progressivism came around and classrooms started doing projects and there was much interplay among the students and physical movement in the room. Many educators wanted instruction to be both productive and have the children learn more and faster while teachers teach less. This led to the instructional tools, to make learning more stimulating, like film, radio, television and computers.

Instructional technology has a history dating back to 1919, when five national visual instruction organizations were established. The first two, the National Academy for Visual Instruction and the American Educational Motion Picture Association, lasted less than a year. No specific reason for the organizations to have vanished was given. In 1920, the third organization, the National Academy of Visual Instruction, was created by approximately forty educators banding together. The Visual Instruction Association of America was organized, two years after the Academy. In

1932, the previous two associations merged together with the National Education Association Department of Visual Instruction, that was originally established in 1923. The Department of Visual Instruction gradually grew in membership and prestige (Saettler, 1968).

By 1923, 21 educational institutions offered courses in visual instruction, besides conferences and informal courses on familiarizing teachers with the techniques of using films in teaching. Another important landmark in the visual instruction movement was the founding of journals devoted solely to visual instruction (Saettler, 1968).

When World War II emerged, the focus turned to industrial training and military training programs. The war effort brought the convergence of audiovisual into the mainstream of instructional technology. During 1945-55, the movement continued to grow at a steady pace. Beginning with 1955 to now, teaching machines which are devices that use question and answer techniques of instruction ranging from simple boxes to electronic devices wired for light and sound, television, multimedia presentations and the use of computers have made their appearance (Saettler, 1968).

According to Brown, Norberg and Srygley (1972) in the 1940s and 1950s, the expansion of media and related technological resources for teaching was paralleled by increasing emphasis upon newer media and instructional



techniques in audiovisual, library science, and other courses designed to help teachers master these new tools of the trade. Such courses contained varying amounts of background psychological material and discussion of media characteristics, usually combined with a heavy emphasis on techniques of use, demonstrations, selection and preparation of materials, and laboratory practice of various devices teachers were expected to be able to use in their own classrooms.

Cuban (1986) stated in 1982 Time magazine put a computer on the cover of its issue heralding the editors' choice of "Man of the Year." As with film, radio, and instructional television, cultural forces pressed schools to embrace computers.

#### Evaluation of Use and Value

Brown, Norberg and Srygley (1972) stated the predicted future outlook in the instructional technology field is seen, with some confidence, as moving in the direction of especially increased use of overhead transparency projectors, portable videotape recorders, television receivers, 8mm projectors, audiotape recorders and individual computers.

Evans-Andris (1996) stated among the teachers she observed, there were two general orientations to computer technology. The majority of teachers tended to engage

primarily in distancing routines, limiting their involvement with computers, whereas the remaining teachers tended to engage primarily in embracing routines, increasing their opportunities to use the equipment. Teachers hesitated to jeopardize the security of their consistent level of classroom performance to introduce unfamiliar computer materials and methods into their teaching routines. Task displacement was a serious concern voiced by many teachers.

According to Haas (1960), through the use of instructional technology, students are said to learn faster, learn more, remember longer, give better attention and have better morale. These claims are mostly unsupported by facts and little has been done to validate the claims. Although instructional technology appears to have more substantial value than not, there is a tremendously large gray area about which we can make no valid or reliable statements.

Haney (1975) reported students are influenced and have a tremendous knowledge of world events, problems and understanding of human nature. They have been exposed to television, motion pictures, radio and newspapers. Students have a way of interpreting reality through these mediated formats. An announcement from the principal's office, when read to the class, becomes a commercial and the end of the year review becomes a rerun. With the already information center the student has at home, teachers should add

structure and direction to the learning process with instructional technology, taking into consideration the knowledge explosion.

Erickson and Curl (1972) noted that students are acutely aware of the world's problems and feel frustrated because they see so little being done to eliminate fear, waste, greed and poverty. Students are eager for action, experimenting with life, sharing experience with others, through instant communication. More than a million students leave school without graduating, because they simply see no reason to stay. Many beginning teachers start out with lectures because verbal communication seemed sensible. They have all the information and the students have none. Few teachers have the talent to give an effective lecture. Students soon learn that school is boring and meaningless. Everyone must be a lifetime learner and communicator in the changing world. Modern learning theory no longer focuses on the teacher or textbook, but upon each human learner and their personal needs and goals to be able to lead a satisfying and productive life.

Cuban (1986) stated in all of the enthusiasm for classroom computers, an assumption that has gone largely unchallenged is that these machines, with appropriate programs, could teach students basic knowledge and skills both efficiently and effectively. The inference in the

shadow of the assumption is that the new technology could get students to learn better, faster, and more cheaply than any other instructional tactic.

According to Sloan (1985) the central question is not whether one is for or against computers in education, but to define the human and educational criteria and priorities that can make a truly human use of the computer possible. There needs to be a critical look on what is appropriate and what is inappropriate, between what is helpful and what is damaging, the the uses and places of the computer for different purposes and for different types and ages of students.

Cuban (1986) reported that given the current organizational settings, classroom computers should be used by teachers to cope with the routine, often tedious, student learning problems that machines can do patiently. As unimaginative as drill, simulations, games and enrichment software may strike reformers, these uses do fit well teacher's needs in adapting to the restless, unpredictable nature of classroom life. These restricted uses of the new technology appear outrageously conventional. Yet unless existing classroom and school settings are altered substantially, much beyond the conventional will be tough to attain.

Dispelling widespread myths, studies found that instead of isolating students, access to technology encouraged them to collaborate more than in traditional classrooms. Instead of becoming boring with use, technology continued to engage students as they gained in knowledge and skill in generating ideas and products. There was evidence that students were developing positive attitudes toward themselves and toward learning (Fisher, Dwyer and Yocam, 1996).

The most important piece of hardware in the classroom isn't the multimedia computer, the video camera, or the network. The teacher's desk is where any innovation must pass in one form or another before the innovation gets to students. The teacher isn't merely a gatekeeper; he or she is an orchestrator of activity and will greatly influence how technology fits into the classroom (Fisher, Dwyer and Yocam, 1996).

Cuban (1986) stated teachers have rationed their time and energy to cope with conflicting and multiple demands and have constructed certain teaching practices that have emerged as resilient, simple, and efficient solutions in dealing with a large number of students in a small space for extended periods of time. Lecturing, recitation, seat work, and homework drawn from texts are direct, uncomplicated ways of transmitting knowledge and directions to groups. The tools that teachers have added to their repertoire over

time, such as the chalkboard and textbooks, have been simple, durable, flexible, and responsive to teacher-defined problems in meeting the demands of daily instruction.

#### Advantages, Issues and Changes

Haas (1960) noted that the general belief is instructional technologies have their own definite and specific advantages for instructional success. They are said to aid the student to learn swiftly and effectively. Instructional technology, properly used, can create more vivid impressions, stimulate additional organs of sense, hold the student's attention through change of pace, simplify the knowledge to be learned and improve the quality of the instruction given.

The literature indicated that instructional technology may perform superhuman tasks for the teacher. Instructional technology provides the teacher with a means for extending their student's scope of experience, provide meaningful sources of information, and provide teachers to be able to launch students into a wide variety of learning activities, help the teacher overcome physical difficulties of presenting subject matter and offer opportunities for students to develop communication skills while engaged in solving meaningful problems (Erickson and Curl, 1972).

Haney (1975) believed the variety of media provided teachers with powerful and flexible communication tools and

that the media significantly affected the quality of learning experiences for students. Media allows the opportunity for independent study, with individual variation in time, content and presentation modes, depending on interest and learning styles.

Cuban (1986) stated stunning jumps in school-district purchases and corporate gift programs suggest student access to machines will expand beyond the current handful of computers for each school. Nonetheless, the programs that run the machines continue to influence school use. Inadequate software, especially in social studies, English, foreign languages, art and music continues to weaken efforts to increase teacher use.

Fisher, Dwyer and Yocam (1996) believed the ways in which the education community has gone about encouraging change in the past have not looked at the individual teacher, for the most part. Teachers and schools will only change when districts and ultimately the community practice what they preach. Districts say they want teachers to reflect, but they don't give them the time to reflect. They want teachers to use technology, but they don't give them the tools or support to use technology. In many cases, even when tools are provided, those tools are outdated. If we want student outcomes that will be more applicable for twenty-first-century jobs, we must stop relying on

nineteenth-century pedagogy and equipment, as well as school design and administration models.

According to Haas (1960), a concern when using instructional technology was if an error of omission, distortion, misapplication or overemphasis is made, the message would be carried down the communication line to the learner. Second, some instructors had the idea that they had little or nothing to do when instructional technologies are employed. This idea often leads to ineffective teaching. Some instructors feel that all they need to do is turn a switch, and presto, the job is done.

Even though instructional technology allows a wide range of instructional choices, teachers and administrators were still accustomed to making all media decisions in terms of presentational requirements. The shift in technology focuses from classroom to curriculum planning, from tactics to strategy, which are not well accepted, when affecting the roles of personnel, budgetary considerations, instructional management rearrangements and research requirements (Erickson and Curl, 1972).

Cuban (1986) stated film and radio did not excel in the classroom due to limited access to films or programs, lack of skills in using the equipment, cost of maintenance, limited availability and scheduling hassles of equipment (1 projector per 10 teachers). Also, television was not seen



to deliver the total instructional program. In the 1950's, television was still seen as a helper to the teacher and in the 1960's, television cooled off the same time the teacher shortage ended. Computers, much the same were pushed by forces outside the schools. Most teachers initially were uninvolved in the hoopla. Though, computers had an advantage due to the simultaneous top-down and bottom-up movement.

Brown, Norberg and Srygley (1972) reported the teacher's independent use of some media in individual classrooms will certainly not disappear. Equipment used by individual teachers and students will no doubt continue the trend toward reduction of size and weight and greater simplicity of operation. However, as the teacher is relieved of mechanical risks and difficulties in operating technical devices, they encounter new and complicated utilization problems that result from more highly integrated instructional processes and from increasing individualization of instructional and learning procedures.

According to Evans-Andris (1996) schools struggle to stay abreast of rapidly changing technology in their attempt to acquire and then replace first generation computers with newer, more sophisticated equipment. The expense of purchasing, maintaining, and updating equipment and training

teachers to use presents a staggering financial burden for school districts.

According to Fisher, Dwyer and Yocam (1996), good teachers line the walls with student work and make lots of materials available to students in their classrooms. They will not turn over their classrooms to a lot of bulky machines and proposed solutions, such as building computers into desks, that are not likely to have widespread application. Nor will managing a class be easy in which the teacher must cope with a shortage of machines by arranging for simultaneous activities with some students working on computers and some not. Nor will many teachers be willing to take their students down to a computer lab, leaving all their classroom resources behind and having to compete for time with other teachers. The unfortunate fact of life is that the design of the school and the design of the computer are not currently compatible.

Sandholtz, Ringstaff and Dwyer (1997) report that changing the classroom environment to include technology may not eliminate many of the age-old problems in a school system like limited time, classroom management, scarce resources and pressure to cover the curriculum. Introduction of technology forced teachers back into a first-year-teacher mode, starting over again with issues of discipline, role definition and lesson development.

Instructional technology challenged the teachers' beliefs about their identity as teachers, their authority base and the notion about the value teachers bring to teaching. Teachers are the gateway to change and teachers will determine whether technology will significantly influence education.

Fisher, Dwyer and Yocam (1996) stated as a new generation takes leadership in research and development, innovation in technology and education may accelerate in the next few years. These new leaders will have grown up with reasonable computer tools. The next generation will come to school from inside the computer learning culture.

Garmer and Firestone (1996) reported new communications and information technologies are driving dramatic changes in learning. As a result, the paradigm for learning is shifting away from the traditional notion that knowledge is transferred from teacher to student, within the confines of the classroom. A new understanding of learning, places the learner at the center of the learning process, with the teacher serving an important supporting role in facilitating the process. It is the necessity to unlearn old habits and notions of how learning should be structured, and instead develop new habits of instruction that motivate learners to take greater control over their own education. Teachers will have to give up a measure of control over the learning

process and adapt to a new position on the sidelines as educational coaches.

Technology-rich classrooms increasingly generated new situations related to student assessment. While questioning traditional forms of assessment, teachers also knew that their students would still be required to perform on standardized tests in other situations. Solutions to these and other assessment issues have lagged behind the instructional changes and continue to be a serious concern (Fisher, Dwyer and Yocam, 1996).

## CHAPTER IV

## CONCLUSION

Teachers are discovering teaching is less satisfying when lecturing and much more satisfying when watching students discover things about themselves and the world. Instructional technology allows teachers to make learning more interesting, challenging and productive. Teachers can be the creator and manager of a stimulating learning environment. Communication can take place only if the message has been understood between the teacher and student. Instructional technology assists teachers in altering the means by which students engage in learning.

The challenge to those committed to school improvement, is to acknowledge that both continuity and change are interwoven in the schooling process. For effective utilization of instructional technology, teachers need to know what is available for them to use, they need to be an integral part of the selection, learn how and when to use the selected technology. Instructional technology has a place in the teaching world. If used appropriately, instructional technology can be very rewarding for both teacher and student.

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