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Learning Technologies: Transmitting or Transforming Education?

By

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ABSTRACT

Learning Technologies: Transmitting or Transforming Education?

As we approach the next millennium, an interactive learning environment is becoming the norm as opposed to a traditional classroom setting. In this New Information Age, today’s colleges and universities are facing a challenge to prepare graduates to work and live in this rapidly changing technology-enhanced environment. Educators will have to adopt instructional strategies that can improve and accelerate learning as well as satisfy the needs of their students.

The application of technological competence requires that the teacher assume new roles as facilitators, designers, curriculum developers, on-line information-search consultants, team collaborators, and managers, etc. In their new roles, educators will need to use interactive technology to incorporate authentic scholarship into the students’ experience.

This paper examines the effectiveness of technology-based teaching, especially in journalism and mass communication courses and concludes that it has become incumbent upon educators to not only make the students computer-literate, but teach them to master the data gathering and data analyzing skills so that they will be well-trained to work in the New Information Age.
Learning Technologies: Transmitting or Transforming Education?

The latter half of the 20th century brought an explosion in the use of information and computer-based technologies. With the rapid development of electronic information and communication technologies, the traditional ways of transmitting knowledge are changing tremendously. Educators no longer feel that they have control over the content, pace, time and place of learning since education can be delivered into people’s homes or even remote areas by using a plethora of technologies.

As we approach the next millennium, an interactive learning environment is becoming the norm as opposed to a traditional class-room setting. Coaching, lecturing and presentations are being replaced with electronic classrooms, chat rooms, web sites with digital libraries and video/audio conferences for synchronous remote access. The traditional lecture form from its unidirectional information flow is being changed to a more collaborative activity (Shneiderman, et al., 1998). For example, collaborative and cooperative learning (Edelson, Pea, and Gomez, 1996), inquiry-based education (Norman, 1997), service learning (Jacoby & Associates, 1996), self-paced instruction, and distance education are emerging as the latest pedagogical philosophies.

In this era of tremendous technological growth and information diffusion, today’s colleges and universities have the challenging task of preparing graduates to work and live in this rapidly changing technology-enhanced environment. Educators, in turn, are in constant search for instructional strategies that can improve and accelerate learning as well as satisfy the needs of their students. There are predictions that the use of this technology will reshape, and possibly replace, the existing educational environment (Raymond, et al.,
Shedletsky (1998), for example, an author of a monograph on "Teaching with Computer-Mediated Communication," writes that teaching and learning with computers is transforming "learning, curriculum, and pedagogy in subtle but profound ways."

This paper examines the emerging roles of educators in this new world of information and communication technologies. Specifically, it focuses on the use of new communication technologies in the classrooms, and examines the studies conducted on the effectiveness of technology-based teaching, especially in journalism and mass communications classes.

What is significant in the changes that are being brought about by new communication technologies is that the traditional modes of control used by educators are reducing considerably. Some teachers feel that they have lost the amount of control that they once exercised over students' learning (Race, 1998) since students can often access up-to-the-minute information by using the Internet. Moreover, with the vastness of information that is available over the Internet, teachers may no longer feel confident that their own knowledge and expertise covers the entire gamut of the field that they teach. Some educators resist the opportunities technology provides. They feel that computer activities take up "valuable lesson time" (Evans-Andris, 1995) or time that should be spent doing traditional classroom activities. Some educators simply do not wish to change their teaching style to accommodate computers in the classroom, whereas others feel that computer use would alter classroom atmosphere and structure and result in disruptive activities. Also, when computers were just beginning to enter the field of education, many educators were concerned about the "dehumanizing effect" of computers in classrooms.
Computer anxiety is another major contributing factor for some educators' resistance to use computers in classrooms. However, studies show that computer anxiety decreases with more computer use. Upon examining the computer use among 308 teachers in Lebanese schools, Yaghi and Abu-Saba (1998) found that the teachers' computer anxiety decreased with more computing experience and higher frequency of using computers. Further, the results of the study demonstrate that computer anxiety among teachers is more of a state anxiety that tends to fade away as the experience with computers improves.

Computer anxiety is also associated with the "age" factor. Older faculty members find it more difficult than younger faculty members to use computer applications. Rousseau & Rogers (1998) examined age-related trends in computer utilization among faculty members at a South Eastern University in the United States. They found that the older faculty members did not use as many different computer applications as the younger cohorts. However, there was little evidence that the older faculty members were avoiding new technology. They indicated an interest in receiving further training in computer applications.

Computer literacy is vital for older faculty members since the use of computers has grown exponentially in recent years and will continue to grow in the future at an accelerated pace. According to demographic projections, the number of people older than 45 years in the workforce will continue to rise into the 21st century (Smith, 1990).

While resistance to technology is always a concern, educators are increasingly seeing the power of new technologies and have begun to grapple with how best to incorporate communications technologies in their curriculums.
Once the educators become comfortable in using a variety of information technologies, their roles as traditional teachers (lecturing, coaching and making presentations with the use of blackboards and chalks, overhead projectors, etc.) will change considerably. In the new environment, educators will be envisioned as facilitators, planners, managers, course developers, team collaborators and information consultants, etc. (Joong-Kak Kook, 1997; Hancock, 1997; Lee and Reigeluth, 1994).

**Emerging Roles of Educators**

According to Lowther, et al. (1998), the application of technological competence requires that the teacher assume three primary roles: facilitator, designer, and manager. A teacher's role as a facilitator involves a variety of teacher activities including modeling and guiding (Chi & Hanaffin, 1995). The technology-competent teacher must facilitate the necessary learning experiences to help students bridge the gap between what they know and what they need to know (Collins, 1993). They will need to facilitate, rather than direct, student learning. According to Rowentree (1995), the teacher as facilitator will help students decide upon appropriate instructional goals, and help to identify and coordinate the best means for students to achieve those goals. He adds that the teacher's role as a facilitator will also be in engaging the learners in coming to terms with the concepts and taking ownership of them in their own ways. In addition, teachers will be viewed as guiding and facilitating students' critical and creative thinking in a collaborative learning environment.

Yet, another important role of the educator will be as a designer of new lessons. A teacher can "design instruction that will directly support the achievement of the objectives by using real-world problems from the students' environment" (Lowther, et al., 104). To
design appropriate lessons for technology-based instruction, the teacher needs to understand the relationships between the basic functions of computer application and learning. For example, Kemp, Morrison and Ross (1994) suggest that learning strategies should be selected based on the type of content the students are learning—facts, rules, concepts, procedures, etc., and the topic of expected performance. Zahner et al. (1992) point out that teachers these days have access to tremendous amounts of on-line information ranging from lesson plans, instructional software, data sets and real-time discussions with content experts, as well as CD-ROMs.

A teacher also acts as an effective manager of classroom. Lowther, et al. (1998) state that “A technologically competent teacher plans an instructionally sound rotation schedule that addresses what students will do before they go the computer, while they are at a computer, after they finish computer work, and what they can do at any point during the lesson” (p. 102). Another important aspect of the managerial role is the ability of the teacher to actively solve technical problems that can be encountered while using the sophisticated technology.

In the new environment, the teacher will also be viewed as a course and curriculum developer. Lee and Reigeluth (1994, p. 64) state that in the developing role, teachers “will have to change the content of the traditional curricula, reorder the curriculum based on a new array of skills, and change the structure of the curriculum and the style of classroom instruction.” Furthermore, they will need to “reorganize curriculum delivery, develop strategies for curriculum change, implement the curriculum, and evaluate its implementation” (p. 64).
In classrooms using new technologies, a teacher will also have to assume the role of an online professional information-search consultant (Kook, 1997). Teachers as online consultants will assist students in accessing a variety of resources and materials. Part of providing this education in the best way possible is to acknowledge and alleviate computer anxiety in the classroom. They need to prepare students about what to expect from the Internet and provide detailed instruction regarding Internet searching.

Yet, another important role for teachers in the Information Age will be that of team collaborators. "...The great challenges in the Information Age require computer and communication network support for collaboration among geographically disparate institutions, disciplines, and individuals" (Kook, 59). Kook adds that the great challenges of educational reform require "new kinds of collaborations across previously separate institutional boundaries and among individuals whose work was previously isolated from one another. Computer and telecommunications technologies can support these collaborations, and help provide more equitable access to expertise, information, and tools" (Kook, 57).

Shneiderman, et al. (1998) envision two new roles of the instructors as "guides" and "equalizers". According to them, "Electronic classrooms shift the role of the instructor from 'sage on the stage' to 'guide on the side'. Faculty members not only can present information to the students; they also can devote more time to working with students on interpreting, integrating, and structuring masses of information generated or accessed in digital form" (p. 40). Regarding the role of an "equalizer", they stipulate that "Technology can play the role of equalizer by providing alternative and parallel channels for students to participate in classroom discussions and provide feedback to each other..."
and to the faculty” (p. 41). They further state that the equalizer role is useful for shy students who hesitate to speak in class but can easily share their comments in electronic form anonymously.

**Use of New Communications Technologies in Classrooms**

In the next millennium, educators need to lead students through a careful, accumulative acquisition of information and technology skills (Hancock, 1997). By adopting technology-based instruction, educators can help students think critically, interact rationally, and master the content of the subject matter. They can leave fact-finding to the computer and spend more time in engaging the students in serious discussion and debates about a variety of areas. Ultimately, “the successful application of computer communication technologies in education depends on teachers’ competence in using existing methods and adapting to future developments. (Kook, p. 58).

Research shows that more and more educators have turned to the Internet, World Wide Web (WWW), and Distance Education as a medium for teaching and learning (Hughes & Hewson, 1998; Patchner, et. al. 1996; Saari, 1998; Starr, 1997). Educators are increasingly using the Internet to gather and disseminate information, images, and ideas. They are also finding that online communication can produce much more student-instructor interaction in a large class than would be possible otherwise (Barnard, 1997).

The World Wide Web has allowed the educators to share their work with students. The wealth of information on the WWW can be tailored to the specific needs of the students (Starr, 1997). Educators are increasingly creating web pages for their courses, which provide the syllabi, assignments, and links to appropriate resources for further readings. Writing about the WWW and higher education, John Barnard (1997) predicts
that “web-based instruction could provide a comprehensive model for online
instruction” (p. 32).

With Distance Education, it has become possible to offer continuing education to
people lacking resources or access to a college campus. Distance communication
provides opportunities to such people to engage in professional education and
development. A recent technological development, Interactive Television (ITV), also
known as interactive video or video conference, is an interactive video and audio system
where courses can be taught from one location to students located at a distance site. This
two-way audio and video system provides instantaneous communication where the
instructor can simultaneously see and hear the students at a distant location via video and
audio equipment. ITV also allows the instructor to utilize guest experts who might
otherwise be unable to travel to the distant location. As Ohler (1995) has stated, “In the
Industrial Age, we go to school. In the Communication Age, schools come to us.”

Technological advances in computer applications have further enhanced the ability
of educators to use computer-based approach to especially teach journalism classes.
Traditional journalism is undergoing tremendous shifts, upheavals and changes. As a
result, it is essential for journalists to get well-acquainted with the Internet because
Internet provides a wealth of information on just about any subject in the world. It has the
capability to provide original research and links to extremely useful resources. The World
Wide Web sites provide links to extremely useful resources. The new media also provide
original research capability. The WWW can provide links to government, corporate and
commercial databases which can provide a vast array of information. This kind of
information could be a gold mine for the journalists doing background research for a story
and it is extremely valuable and essential for journalists to make their stories more credible. With the computer-assisted media systems, it is also possible for journalists to program the computers to retrieve articles, sound clips, or video clips about any topic of interest. Because of computer-assisted journalism, teachers and students in the newsrooms no longer have to depend on outside sources for information.

It is now time for every journalist to be conversant in the use of both databases and spreadsheets. Journalism professors need to teach the use of databases, including statistics, spreadsheets to prepare stories with valuable information. By using spreadsheets, students can produce simple charts and graphs from the data to spot trends. Multimedia capabilities of computer technologies enable students to expand their ideas by incorporating graphics, animation, video, and sound into their documents. In addition to Internet, CD-ROMs are another source which journalists can use to look up information. They contain 600 megabytes of information. In recent years, almost every conceivable type of information has been placed on these small computer-accessible disks.

Regarding journalism and mass communication classes, Professor Gunaratne and Lee (1995) predict that “Internet is bound to become an integral part of mass communication before the turn of the century.” Singer et al. (1996) assessed the attitudes of journalism and mass communications students and faculty and concluded that journalism programs play a vital role in shaping the students’ attitudes about new media technologies.

Prof. Dennis Wilkens (1997), who teaches journalism at St. Bonaventure University, states that knowledge and skills about computer-aided communication and reporting through instruction in basic electronic mail, Internet and WWW-based data-
retrieval programs have become extremely important in preparing students to become working journalists because the industry is increasingly asking educators to teach them (p.72).

Underscoring this notion, the AEJMC Curriculum Task Force (1996) concluded that the “purpose of media education is to produce well-rounded graduates who have critical-thinking skills as well as practical skills” and that the media education should “provide students the competencies they need for successful careers in media-related professions” (p. 102).

Educators therefore need to fulfill their roles as teachers by using interactive technology to incorporate authentic scholarship into the students’ experience. It is becoming incumbent upon journalism educators to keep abreast of the new technologies and teach them. In a survey of members of the Association for Education in Journalism and Mass Communication, Scott (1995) found that “Journalism schools must pay more attention to technology as well as pay more for it. Journalism students must master the same skills as always – research, writing, editing and critical thinking – but in addition, they must master machinery more complex than ever before (p.37).

Gunaratne and Lee (1996) integrated the new technology in several journalism courses and concluded that students can “definitely improve their grammar skills through access to on-line writing labs, Listserv and Usenet discussion groups” (p.32).

Writing in a New York Times Magazine (1995) column, veteran journalist Max Frankel said: “The newspapers that prosper in the next century will be the ones that offer the best journalism, that master the subjects about which they write and acquire the talent and expertise to appraise and explain an infinite variety of events . . . It’s talent that they
(newspapers) will need to survive in the digital age—gifted editors, reporters, and image artists who can find meaning in the approaching information glut.”

In today’s more competitive information delivery environment, better research, better reporting, and better analysis are critical. Speaking at a Neiman Foundation Conference (1994), T. J. Johnson explained the importance of the pre-reporting process: “The quality of the information out can only be as good as the data flowing in….Hence, because of this shift in the data environment, educators and journalists must immediately turn more attention to the left side of the equation, the research, reporting, and analysis aspects if we are to improve the quality of the data in analysis components.”

The demand for journalistic skills will continue no matter how the field evolves. Panici (1998) surveyed faculty members to determine how they integrate new media into an introductory mass communication course and how beneficial they find it to do so. The results of the survey suggest “the use of new media within the introductory mass communication offers both opportunities and challenges. Among other things, respondents agreed that “new media technologies empower students to have greater control over the learning process” (p.58), that “integrating new media into the mass communication course creates a more relevant and ‘real world’ experience for students entering the journalism and mass communication field” (p.60), and that “it enhances the learning experience” (p. 60).

**Effectiveness of Technology-Based Teaching**

Regardless of how much the electronic information and communication technologies are being used in classrooms, a major question arises regarding the effectiveness of technology-based teaching and learning activities. Only a limited number
of empirical studies exist which throw some light on the effectiveness of such technologies. According to Prof. Althaus (1997) of University of Illinois at Urbana, “there is still relatively hard evidence to support the notion that computer-mediated communication technology can help create a learning environment superior to traditional face-to-face settings” (p. 158).

However, researchers/scholars from various disciplines have started examining the effects of the use of new media technologies in the classrooms. Following studies offer helpful insights into the effectiveness of electronic classrooms.

Schneiderman, Barkowski, Aloavi and Norman (1998), in their study of electronic classrooms at the University of Maryland, where faculty were provided with an environment so that they could concentrate on changing the traditional lecture from its unidirectional information flow to a more collaborative activity, found that “technology-mediated collaborative learning in the electronic classroom can lead to significantly higher levels of perceived skill development, self-reported learning, and evaluation of classroom experience in comparison to collaborative learning in a traditional classroom” (p.36). Moreover, the final test scores of students in the electronic classroom were significantly higher than those students in the traditional classroom. The authors also found that electronic classrooms and the new patterns of teaching/learning have reshaped processes for many faculty and students at the University of Maryland.

The assumption that Computer-mediated communication technology can help create a learning environment superior to traditional face-to-face settings has been tested by several scholars. Several experiments have been conducted to examine computer-
mediated communication results in accelerating learning as well as enhancing the academic performance of students.

Christina Dehler and Laura Porras-Hernandez, Ph D. candidates in Educational Technology at Concordia University in Montreal, designed a computer-mediated learning activity for graduate level courses in educational technology at two different universities—one in Canada, the other in Mexico. In both courses, a cross-cultural discussion addressed the social implications of the use of technology in education. They discovered that CMC learning turned out to be quite effective at the learner, teacher, and classroom levels in terms of learning, attitude toward technology, and attitudes toward other cultures. This cross-cultural exchange proved to be invaluable for teachers and students alike because it provided the students with the opportunity to experience an authentic technological application and share knowledge among themselves and with the teachers. From the students' perspective, this cross-cultural exchange provided an interesting and unique source of information as well as made them realize that "technology is used and valued differently by distinct groups of people and that these diversities are contributing factors to gaps in information and technical literacy that exist among different populations."

An experiment conducted by Scott Althaus, a professor in the departments of Speech Communication and Political Science at the University of Illinois at Urbana, also found that a combination of face-to-face discussions and computer-mediated discussions provides students with a learning environment superior to that of the traditional classroom. In a quasi-experimental study involving 142 undergraduates at the University of Illinois at Urbana, Althaus(1997) found that students actively involved in CMD groups not only reported learning more than they otherwise would have, but they also tended to
earn higher grades than students taking part in face-to-face discussion only. The students reported that their participation helped them learn the ideas and theories covered in class and recommended that computer-mediated discussion be available in their other classes.

In another study, Patchner, Petracchi and Wise (1996) compared graduate students enrolled in a social work research methods course in utilizing face-to-face instruction with students taking the course at a distant location via interactive television. Additionally, the authors also measured students' attitudes toward distance education as well as students’ experiences in the course. This study demonstrated that instruction via interactive television performed as well as students receiving face-to-face instruction in a foundation. Students in both groups indicated that they would have preferred face-to-face instruction but found interactive television as an acceptable mode of instruction for those having no other means of access to such education.

Crook and Brady (1998), surveyed students from two courses at Florida State University to judge the integration of an Internet-based shell program into traditional social work courses. They found that the majority of students felt that the computer work enhanced their educational experience and increased their comfort of learning. The students in both the courses had a positive experience with computer-assisted learning as a supplement to the traditional classroom environment.

In another survey based on interviews with students completing the first half of a Masters in Social Work program delivered through distance education and a comparable group of students on the main campus, Paul Freddolin (1998) found that the School of Social Work's Distance Education Initiative is a viable alternative to the traditional program, but that "it certainly is not anyone’s preferred option" (p. 39).
Yet, in another experimental study of teaching one section of a social work research methods course on the Internet, with no meetings on the campus, and another section of the course being taught on campus without the Internet, Stocks and Freddolino (1998) found that although students in the Internet section liked the flexibility inherent in the design of the course, they found the lack of face-to-face interaction as a negative feature. However, the researchers found that the Internet course is an effective way of taking social work education to people who are unable to commute and attend a university for an interactive class.

Alavi (1994) conducted a study of 127 graduate business students to compare the electronic classroom and a traditional classroom according to the learning outcomes and student evaluation of the learning process. The study's findings indicated that technology-mediated collaborative learning in the electronic classroom can lead to significantly higher levels of perceived skill development, self-reported learning, and evaluation of classroom experience in comparison to collaborative learning in a traditional classroom. Furthermore, students in electronic classroom scored higher test grades than those students who were in the traditional classroom.

Writing skills can also be enhanced by using computer software in electronic classrooms. Rowley, Carlson & Miller (1998) conducted a series of four experiments to evaluate and adapt the Writing Software Reading & Writing in a Supportive Environment (R-WISE), intended to support the development of writing skills among high school students. The four studies demonstrated that R-WISE research proved to be a unique experience in its large-scale classroom context and in large and diverse groups of schools and was moderately effective in improving student writing outcomes.
Despite the enormous advantages of integrating new communications technology into teaching, educators are finding it quite challenging to incorporate it into their day-to-day teaching. Witmer (1998) highlights four key challenges that educators face in incorporating computer-mediated communication into journalism and communication courses: students' discernment of when and how to use the technology; computer-related anxieties; fear of technical vocabulary; and perceived relevance of technological use. To overcome these challenges, she offers three goals that teaching communication technology should meet: conceptual understanding of CMC technologies; development of technical skills and synthesis and incorporation of CMC into everyday work as an educational resource.

An obvious disadvantage of electronic classrooms is the lack of face-to-face communications. Students can miss out on the rich experience of interpersonal communication because of lack of face-to-face communication, body language, facial expressions, vocal tone, etc. which can be used to get the message across effectively. In electronic classrooms, students miss out on all these cues.

**Future Use of New Communication Technologies in Classrooms**

Levinson (1997) speculates on the future development of meeting human communication needs. He stipulates “that while information media can significantly extend our capability to perceive our world, they cannot replace the human organism's required interaction with physical and social environments.”

Wilkens (1997), professor of journalism at St Bonaventure University, also states that “Despite the emergence of computer-aided reporting and electronic journalism courses, journalism remains very much a human enterprise.”
Databases do not produce good stories by themselves. As Forum magazine (1993) put it, “Computer-assisted reporting is still reporting, and sound journalism practices apply.” Databases are maximized for sorting and storing text. Spreadsheets are maximized for mathematical functions. It has thus become incumbent upon educators to not only make the students computer-literate but facilitate them in mastering the techniques of data gathering and analyzing so that they are well-trained to perform in the New Information Age.
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