

TECHNOLOGY AND THE EDUCATIONAL PROCESS: TRANSFORMING CLASSROOM ACTIVITIES

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ABSTRACT

Technology is now being widely used in the classroom to enhance and enrich teaching and learning. The availability of new information technology is contributing to many innovations in classroom activities. Strategies/techniques now used to support technology in teaching and learning enable teachers to work collaboratively with students while the students themselves become more immersed in their own learning. The purpose of this paper is to explore the integration of technology in the education process and some of the changes they have generated in classroom activities.

New information technologies are increasingly being adapted and integrated into the educational process. The growing use of these technologies in teaching and learning activities has given rise to numerous questions. Are the new technologies changing the traditional approach to classroom activities? How much are the technologies changing the strategies/techniques used in the delivery of instruction? Are the technologies changing the quality of interpersonal relations in our classroom? This paper explores the integration of technology in the education process and some of the changes they have generated in classroom activities.

Technology of one kind or the other has always been used in the educational environment. For years the printed page, chalk and chalkboard, overhead projectors, filmstrips, 35mm films, and other devices have been utilized, and continue to feature in the teaching and learning process. The use of these technologies very often confined instructional and learning activities to a specific place and time. However, the emergence of newer forms of technology (e.g., computers, computer discs interactive (CD-i), videodiscs, DVD, desktop videoconferencing, Internet) have created a renewed interest for their use in supporting teaching and learning activities. These technologies are also capable of promoting educational activities (synchronous or asynchronous) which are not confined to specific time and/or place. The adoption and use of these technologies for instruction and learn-

ing is believed to be worthwhile, particularly, because of their prevalence throughout the society. Many of the technologies are widely used in the workplace and students are expected to be familiar with them before they enter the workforce.

It is frequently thought that the education sector is slow in adapting to technological changes. Nevertheless, the classroom is vulnerable to technological innovation, as this is where the old and the new must coexist. The coexistence of old and new technology creates a tension that will lead to remarkable changes in education for the twenty-first century and beyond (Kaha, 1990).

The infusion and integration of the new information technologies in the classroom have had an immense impact on the educational environment. Perelman (1992), in his critique of educational technology, identified some ways in which information technology has affected the education process. First, he believed that where learning was perceived as a human process, with the new information technology it has become a transhuman process as people share with increasingly powerful artificial networks and brains. He also believed that where learning was once based in a school classroom, the emergence of new information technology has seen learning permeating every form of social activity outside of the school, from work to entertainment and home life.

TECHNOLOGY IN TEACHING AND LEARNING ACTIVITIES

Education and training activities are increasingly employing the use of a variety of technologies to support pedagogy and learning. Several of the technologies used are computer-based. Word-processors, spreadsheets, and databases are being utilized as tools in supporting teaching and learning. Graphics and desktop publishing software now allow teachers to develop more instructional materials to their own specifications. Correspondingly, teachers are utilizing testing and measurement software, CD-ROMS, compact disc-interactive (CD-I), DVD, hypertext, hypermedia, and multimedia tools to enhance classroom activities.

The vast array of new technologies now available for teaching and learning activities open new vistas for those engaged in the process. The emergence of the Internet and its resources (e.g., World Wide Web, electronic mail, newsgroups, and listserv) have provided access to information, resource personnel, teachers and students in other districts, counties, states, and even in other countries. The Internet is being used to help facilitate interaction with individuals and groups, parents, teachers, and school administrators. It also provides access to instructional materials and other information, which might not otherwise have been readily available to students and teachers within a classroom setting. With the Internet, both teachers and students are exploring different countries and their cultures without leaving the classroom. Visits are made to museums and various research activities are conducted as the Internet facilitates ready access to a variety of databases.

Telecommunication technologies--audioconferencing, videoconferencing (including desktop videoconferencing), computer conferencing, and satellite--are being widely used in education to bring events into the classroom while they

are happening. The technologies are used to put students in touch with resource personnel from different disciplines and facilitate teaching and learning at a distance. Accordingly, the integration of telecommunication and computer technologies is expanding the classroom beyond their walls. The technologies, therefore, allow those who wish to continue their education to do so more readily wherever they are regardless of their life responsibilities which might have prevented them from attending classes at the university or college location. Thus, location and time no longer serve as deterrents to continuing education. With the availability of these technologies, learning is no longer encapsulated by time, place, and age but has become a pervasive activity and attitude that continues throughout life and is supported by all segments of society (Kozma & Schank, 1998).

THE CHANGING CLASSROOM ENVIRONMENT

The infusion and integration of technology in the education process have presented new avenues by which teachers can enrich and enhance teaching and learning activities. However, teachers respond to their use in the classroom setting in a number of ways. First, there are those teachers who fear using any form of technology apart from those with which they are very comfortable (e.g., chalk/chalkboard and printed page). Second, others make use of some form of technology even if they do so infrequently (e.g., overhead projector and videotapes) during class presentations. Third, some teachers maximize the use of different technologies sometimes to the point of overuse during classroom activities.

The different ways in which teachers respond to the need to integrate technology in classroom activities may be predicated on their pre-service training and additional encouragement provided in the different educational environments. (See Roblyer and Erlanger, 1998). Many teachers, however, are not prepared to use technology to support their classroom activities. According to Grabe and Grabe, (1998) approximately fifty percent of teacher-education graduates surveyed felt they were either not prepared or were poorly prepared to use technology. To address some of these deficiencies teachers are provided numerous opportunities to participate in conferences, workshops, and training programs, which serve to encourage them to learn how to use a variety of technology and different ways by which they may be integrated across the curriculum. This journal and others have also been serving a pivotal role in helping teachers to contend with various issues related to the integration of technology to support pedagogy and learning. Articles have not only been geared towards theoretical issues but have also provided examples of practical applications from which teachers can learn and model effective practices as they employ technology in classroom activities.

The increasing application of technology to support teaching and learning provide a basis by which some teachers reconsider the strategies they use in instructional activities. Different strategies are being employed in conjunction with the more familiar ones to accomplish the necessary learning objectives. The

strategies adapted have resulted in students playing a greater role in the teaching and learning process. This occurs, as students become more involved in determining the sequence and strategies used in directing classroom activities. Under the teacher's guidance students are involved in collaborative learning activities. Together teachers and students use different technology to access information, communicate with others in different geographical locations, and explore new instructional media systems.

Students are playing a more significant role in classroom activities. Many students are more familiar with some of the technologies employed in the educational environment. Hence, they are often called upon to help both the teacher and other students to understand how the technologies work. They also show a high level of resourcefulness in determining different ways by which the technologies available might be used to support teaching and learning activities. Working together in this new learning environment, teachers and students become teams of 'knowledge explorers' who translate textbook knowledge into new exciting presentations, using the different technologies (D'Ignazio, 1990c). Consequently, learning for many students become more exciting as they are actively involved in the process.

This dynamic interchange now taking place between and among teachers and students has clearly revolutionized classroom activities. D'Ignazio (1989, 1990a, 1990b), who has written on the application of multimedia systems in educational settings, has used such terms as "knowledge explorers", "knowledge navigators", "teacher explorers", and "student navigators" in describing the various activities in which both teachers and students often engage as they utilize multimedia systems in the classroom. D'Ignazio (1990c) further observed that within this new classroom environment teachers act as process and knowledge specialists.

The infusion and integration of technology in classrooms will not only result in the greater use of collaborative learning strategies but also will, as D'Ignazio (1990a) indicated, increase the use of strategies such as thematic teaching, guided inquiry apprenticeship, group problem solving, and critical thinking. These strategies will help to deepen and enhance interpersonal relations in the classroom. The level of interaction between and among teacher and students increases as they work collaboratively to accomplish various learning objectives. Classroom activities will then be less centered on the teacher and can be more focused on the learners.

Lane (1994) noted that the use of electronically mediated instruction (EMI) to duplicate the traditional face-to-face classroom has resulted in a shift from teacher centered to learner-centered classes. In this situation the responsibility for learning is shifted to the student and the teacher facilitates the learning by acting as a coach, resource guide, and companion in learning. Instructional technology does not only encourage teachers and students to work collaboratively but also results in more cooperative learning activities among the students.

By working cooperatively, students help each other to understand more about the technology and how to use it to accomplish set learning objectives, thereby increasing the level of interaction between and among them. Under such condi-

tions students experience a change from an individual task structure with frequent whole class instruction to a task structure in which they interact in small groups. Thus, facilitating an atmosphere of cooperation rather than competition in the classroom (Slavin, 1980).

As efforts are made to get teacher and students to collaborate and cooperate in their classroom activities more and more is heard about a constructivist approach to education. This has led many teachers to embrace a constructivist approach to teaching and learning over and above a directed approach. The constructivist perspective, which evolved from some branches of thinking in cognitive learning theory, is based on the concept that knowledge is produced by the individual learner rather than processed from information received from an external source (Forcier, 1996; Roblyer, Edwards, & Havriluk, 1997). The directed perspective, also referred to as objectivist or behaviorist, is grounded primarily in behaviorist learning theory and the information processing branch of cognitive learning theories and is based on the concept that learning happens when knowledge is transmitted to the learner (Forcier, 1996; Roblyer, Edwards, & Havriluk, 1997).

Despite the differences between the two perspectives on teaching and learning, they can both be employed to ensure an effective and efficient educational environment. Some uses of technology in teaching and learning are associated with directed instruction (e.g. drill and practice, tutorials) but many other applications (e.g. problem-solving, multimedia applications, telecommunications) can be used to enhance both the directed and the constructivist approaches, depending on how teachers integrate them in classroom activities (Roblyer, Edwards, & Havriluk, 1997).

CONCLUSION

The introduction of new information technology in teaching and learning has impacted the traditional classroom activities. The various technologies generate a greater level of interaction between and among teachers and students. They also help to enhance the educational environment while providing enrichment in the learning experience. However, technology use in the classroom should only be considered appropriate if it is used for specific purposes in the teaching and learning process. Its incorporation in this process should not just be as an appendage, but as an integral part of the teaching and learning objectives. Employing technology of any kind in the instructional process becomes valuable only when they are seen merely as elements in a well-constructed learning environment (D'Ignazio, 1989). The use of technology, therefore, should be driven by specific objectives related to instruction and learning with direct linkages to the curriculum.

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