COMPUTERS: EDUCATIONAL TECHNOLOGY PARADOX?

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ABSTRACT
As we move further into the new millennium, the need to involve and adapt learners with new technology have been the main aim of many institutions of higher learning in Malaysia. The involvement of the government in huge technology-based projects like the Multimedia Super Corridor Highway (MSC) and one of its flagships, the Smart Schools have invoked responses to many institutions of higher learning to change their method of educational instruction to fit the present-day needs. To view the computer as nothing more than the latest thing in educational technology is to miss the whole point about the computer and its main function in schools or universities.

For the academia, computers should play a much bigger role than as a productive means in teaching. Instructors or lecturers should harness the power of the computer and putting it to work as a teacher. The expectation was that the computer should be as effective as a human teacher/lecturer, and would soon be less costly. As in other areas of modern life, efficient technology would replace labor-intensive practices and change the shape of education.

THE CHANGING ENVIRONMENT OF HIGHER EDUCATION

Higher education in Malaysia is being driven by the changing nature of our students. Today's students are coming to higher education with increasing levels of comfort and facility with technology. This brings with it matching student expectations for how services will be delivered and how they wish to use technology to support their learning. The population of traditional or adult learners has shown a marked increase at many of our local universities. Thus, these students are faced with a multitude of commitments and demands on their time. Technology that makes information and services more accessible to students at any time, any place and, any pace will be very valuable and increasingly expected.

Besides the changing student population, we are also witnessing the fundamental changes in the higher education system fueled in part by a series of government decisions. The government priorities for education are also heavily guided by a focus on job training and employment after graduation. Other trends and strategies with regards to higher education that are emerging in many jurisdictions include:

- Increased competition amongst institutions for best students and best faculty members.
- Growing focus for educational institutions as they define their "niches", their "best practices" in order to excel within their strategic framework. Trying not to be all things to all consumers of education.
- Removal of bureaucratic boundaries within institutions in order to become more nimble.
- Rising collaboration at multiple levels, in many cases enabled by technology: at an administrative level between departments; between faculties; between institutions at a programmatic level as well as in libraries, support and services; amongst students for learning.
- More diversity in educational offerings due to "life-long learning" needs, multiple careers, changing workplace.
- Increasing influence of "for profit" business elements – new and increased competition coming from a growing variety of providers such as from the private universities and colleges, the open universities, virtual colleges and e-learning.

EDUCATIONAL TECHNOLOGY VIEW

The educational technology view of the computer is as old as the computer itself (Luehrmann, 1994). In education, promises of instant access to libraries and databases, or of interactive online tutoring sessions with experts, raise our hopes that the Internet will be the new cure for Malaysian education system. Proponents of this theory say that our students need to master critical information-age skills in order to solve today's complex problems. Rather than letting the students construct their own learning environments, teachers use "chalk and talk" to pour knowledge into the heads of students who continue to be passive learners. Teachers are responsible for large number of students with varied abilities and learning styles. In Malaysia's current educational system they go on to say, students have limited opportunities for cooperation and collaboration. Therefore,

communication and information resources, brought to the classroom by networked computers can excite and challenge all students. Students will have the opportunity to assume various roles, from explorer to world traveler to intelligence analyst to scientist. They learn to be "creative, adaptable risk-takers" with skills and information they will need as information-age workers and lifelong learners.

Also, the Information Era has transformed our world, yet left our schools untouched. Michael Kirst, an expert on educational change from Stanford University, says, "If your great-grandmother came back to visit a classroom today, she would recognize almost everything. In the last hundred years, the only classroom innovation that has taken root is the movable desk." What this means is that a student's timetable is divided into time blocks of about an hour or two. A group of 20 or more students still sit at their desks or lecture hall. The lecturer spends 95 to 98 percent of class time lecturing. An individual student averages about 0.5 responses per period. The technologies used? Books, the white board and occasionally, an overhead projector. (Luehrmann, 1994).

Therefore, the most important thing an educational institution should do with a computer is to teach students to become literate users of the computer, not just recipients of computerized lessons. If the computer is so powerful a resource that it can be programmed to simulate the instructional process, shouldn't we be teaching our students mastery of this powerful intellectual tool? Is it enough that a student be the subject of computer-administered instruction –- the end user of a new technology? As we see it, the uses of computers in education should cause students to become masters of computing, not merely its subjects. All said and done, let us ponder on this statement by Thomas C. O'Brien, a Professor of Education at the Southern Illinois University, Edwardsville, USA. "As an education tool, the computer is a two-edged sword. An apt definition of the computer is, "ten thousand idiot clerks working at the speed of light," and it is true that computers will do foolish things – effortlessly and speedily – if we ask them to do so. They can deliver nonsense syllables by the megabyte."

THE ROLE OF THE TEACHER IN ED-TECH

People are the most important part of an information system (O'Leary, 2002, p. 6). Similarly, the most important element in educational technology is the teacher or instructor. All educators want students to experience human interaction, the thrill of discovery and solid grounding of essentials: reading, getting along with others and, training in civic values. Only a teacher, live in the classroom, can bring about this inspiration. Few of us could name three multimedia programs that inspired us, but most of us would name three teachers who have made a difference in our lives. Knowledge is changing so quickly today that simply teaching an established body of facts has little value. What has remained constant amongst the changes in education is the teacher and let us not forget the student. Schools should focus on achieving a collaboration between teachers and technology to help students learn. Teachers who work the Internet into their curricula — not for its own sake but to teach students how to use the network to find and use information to reach a goal — turn students into independent learners. Good teachers are able to cultivate in their students hunger for academic and intellectual independence for in today's world education should be driven by good teachers, and powered by good technology. A good teacher is still one of the greatest influences in a student's life.

IT AND THE CURRICULA

Instructional uses of IT can affect the curriculum, instruction, and assessment. (ISTE, 2000). Nowadays, it is an accepted fact that IT is an integral component of every academic discipline, providing both useful tools and becoming an important part of the discipline content. Computer-assisted learning (Kulik, 1994; Mann, et al., 1999) has been shown to have a strong positive effect in student learning. On average, students learn more than 30% faster in computer-assisted learning environments, as compared to traditional school environments. (ISTE, 2000) If that is the case, then our curriculum should incorporate more computer assisted learning subjects.

THE COSTS OF INCORPORATING IT

Information technology does not come without costs. According to Tissue (1997), the types of expenses for incorporating information technology in education are:

1. Capital cost of computer and network hardware and software.
2. Installation cost, including classroom and laboratory renovation.
3. Hardware and software upgrades.
4. Support personnel for hardware and software installation, repair, and maintenance.
5. Support personnel and facilities for training and support for users (instructors and students).

Tissue (1997) further stated that the capital cost of information technology is just the tip of the iceberg because the real costs actually come from training, maintenance, and support. In fact, the life cycle cost of owning personal computers in a distributed environment is 10-20 times the initial price of computers.

Technology Enabled Classroom (TEC), Smart Classroom and the Electronic Classroom (EC)

The purpose of educational technology is to support and foster learning in schools or colleges (Schoeny, 1999). Currently, there is an emphasis on Technology Enabled Classroom (TEC) or sometimes known as the Smart Classroom or the Electronic Classroom. Whatever the name is, university administrators should be aware that technology is here to foster learning and that the administrators themselves should be conversant with the issues surrounding technology integration in the universities or colleges while remaining mindful of the mission or goal of the university to foster learning. Electronic Classrooms are arranged into two basic types: lecturer and interactive classrooms.

The lecturer-classroom consists of an electronically equipped instructor's station and standard student seating. The interactive-classroom offers the same instructor's stations, as well as workstations.

Smart classrooms are general purpose classrooms that have been outfitted to make available presentation capabilities and network connectivity to instructors using laptops in their classes, as well as multimedia presentations. Bearing these in mind, it can be noted that most classrooms at the main campus (Shah Alam) of University Technology Mara do not fall into either category including the computer labs. In order to have at least one Technology-Enabled Classroom (TEC), one of the computer labs should be further equipped with video displays for video conferencing, CD-RW, scanners, and other necessary multimedia hardware befitting a proper TEC. Furthermore, to use these educational technologies effectively and avoid being distracted by the usual malfunctions and dense manuals, the lecturers must spend a lot of time in the TEC themselves (Downes, 2000). If the TEC has been included in the faculty's Strategic Plan, then a viable return of investment would require that the TEC does not turn into the proverbial "white elephant".

It is interesting to note that today's educational technology is moving away from complicated technologies toward simpler innovations. As technologies mature, they tend to become easier to use and frequent use of technology is expressed in the idiom, "Practice makes perfect". Furthermore, technologies used by teachers or lecturers in the classroom should be widespread and easy-to-operate, that is, a learning simulation, a conferencing tool, and a student record keeper should be trouble-free to use "good" technology. Downes (2000) has distinguished technology into good and bad ones. "Bad" technologies are the very complicated ones while "Good" technologies should have the following features (Figure 1):

FIGURE 1 – CHEKLIST OF GOOD TECHNOLOGIES

(Source: Nine Rules for Good Technology, University of Alberta)

	GOOD TECHNOLOGIES	FEATURES
1.	Good technology is always available.	In the educational field, the equipment trolley is necessary because only one OHP projector, LCD projector or computer are available to serve many classrooms. Good technology does not require scheduling, relocation or set-up. Even though the availability requirement raises cost considerations, the equipment that costs less is more likely to be available. If a technology meets the other criteria, it will be made widely available despite cost.
2.	Good technology is always "On".	That is, good technology can be turned on with a one-stroke command when the need for it arises. Much of today's educational technology requires long and sometimes cumbersome initialization procedures.
3.	Good technology is always connected.	Good technology can send information when and where it is needed without human intervention. For example, telephones are useful because no procedure is required to connect to the telephone system.
4.	Good technology is standardized.	The anomalies: One TV functions much like another TV. One telephone connects to any other telephone in the world. Standardization promotes interoperability. Interoperability means that you have choices, that you are not locked into one supplier or vendor. It means that you can adapt easily to improved versions of the same technology.

5.	Good technology is simple.	Simplicity is a slippery concept, but the best technologies can be learned by looking at the input device, not by studying the manual. Simplicity also goes hand-in-hand with the range of functions or short-cuts.
6.	Good technology does not require parts.	The fewer times you have to purchase or replace certain parts of technology, the better. The best technology requires no on-going purchases or replacements at all.
7.	Good technology is personalized.	Some of the simplest technologies succeed because they are per-sonalized, for example, e-mail. E-mail is useful because you have your own e-mail address.
8.	Good technology is modular	"Modular" here means the com-position of distinct entities, each of which works independently of the others, may be arranged or rearranged into a desired con-figuration with a minimum of fuss and effort. To a degree, this requirement is a combination of the requirements that good tech-nology be standardized and personalized, but modularity takes technology a step beyond either of those features. An example would be the Universal Serial Bus (USB).
9.	Good technology does what you want it to do.	Good technology minimizes the potential for operator error and thus the possibility of un-expected consequences. Good technology is also robust-less prone to breakdowns and mal-functions and are reliable. Software that crashes instead of running is obviously bad technology.

It is important to remember that no technology is perfect but at the same time, we have spent too much time and money on new technology to be satisfied with anything less.

FUTURE OF EDUCATIONAL TECHNOLOGY

In shaping the future of educational technologies, economic and political realities now look to play the leading roles (Feenberg, 1999). Higher education, particularly seems increasingly enamored with corporate rather than professional models of organization. The erosion of traditional faculty status continues apace in innovative institutions serving adult learners, now half the students in higher education. Even the older universities that now teach a declining fraction of students employ more and more part timers in the search for "flexibility." How we design our new technologies depends on which benefits and which limitations we end up with. Indeed, the choice is dependent of the students that populate the educational institutions of the future, since the models of computerized instruction will define the future identities and roles of both the students and teachers or lecturers.

With changing times, technology changes too. Newer technologies will offer promises of any course delivered at any time, anywhere (Bates, 1997). But at the same time, it is important to remember that technology does not necessarily lead to better teaching or learning. This is the paradox. Without careful management and design, technology can lead to a widening gap in the digital divide, to cultural imperialism and the destruction of public education systems. Different people in different positions tend to place different emphasis on the rationale for the use of educational technology. The authors are of the same mind as Bates (1997) that is, some politicians and business people see technology simply as replacement for labor, and therefore anticipate that technology when applied properly will reduce the costs of education. Unfortunately this is to misunderstand the nature of the educational process. While labor costs can be reduced by applying technology, this can also lead to a large decline in the quality of learning, which in turn will eventually lead to a less-skilled workforce.

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