E-LEARNING: A NEW FRONTIER IN EDUCATION

By

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ABSTRACT

This paper explores Information and Communications Technologies (ICT) as an agent of change in education, the e-learning trends, processes and mechanisms. The quest for e-Learning innovations by Institutions of Higher Learning in Malaysia is also highlighted in the paper.

INTRODUCTION

The application of Information and Communications Technologies (**ICT**) is now escalating not only in the classrooms, but also in all places of learning. The traditional mode of classroom delivery is now unable to meet the demand of the knowledge-thirsty. Twigg (1993) suggested that "if we anticipate a future when more students need more learning, there is only one way to meet the need without diminishing the quality of the students' learning experience: We must change the way we deliver education."

Within a context of rapid technological change, many educational institutions are challenged with providing increased educational opportunities by developing non-classroom based education programmes. e-Education, Distance Learning or **e-Learning**, as it is popularly called, is being looked upon as an alternative learning model. e-Learning supports self-directed learning and facilitates a learning strategy that does not depend on day-to-day contact teaching. It makes the best use of the potential of students to study on their own. e-Learning has created a platform for those knowledge-thirsty, especially adults with a new opportunity to acquire college education. It also reaches those disadvantaged by distance and limited time, and updates the knowledge base of workers at their place of employment. A wide range of ICT options is available for the conduct of e-Learning, including Voice, Video, Data and Print.

The concept of e-Learning is having a tremendous growth that facilitates different kinds of people to enjoy the benefits of it with much ease. The rapidly growing number of users and electronic documents is testimony that e-Learning is becoming an everyday part of life for many people. e-Learning is now the **new frontier** in education. Sir John Daniel (1997) concocted the term "Mega University" to designate a university that has at least 100,000 students pursuing their knowledge quest via e-Learning. University of South Africa is the pioneer in this arena and to date, there are eleven such universities all over the world.

Yang Berhomat Datuk Amar Leo Moggie, our Minister of Energy, Communications and Multimedia, in the opening of the "International Conference on e-Learning, 2002", held recently in Kuala Lumpur, stated "Malaysia is aggressively transforming its economy from a

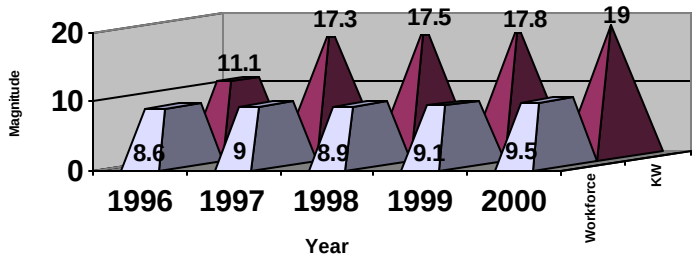
production-based to a knowledge-based one. This necessitates the active role of higher education to generate the critical mass of knowledge workers with the ability to compete in an increasingly technological world. The role of **e-education** becomes imperative because it makes learning more equitable and accessible to the general public.' In Malaysia, most if not all, public and private universities are moving fast into the e-learning market. Private Institutions of Higher Learning (ITPS) in Malaysia are equally aggressive in their e-Learning pursuit.

International Data Corporation (IDC) estimates that the US corporate market for e-Learning will exceed US$7 billion by 2002, representing a compound annual growth rate of 98% from 1997 to 2002. John Chamber, CEO of Sisco Systems stated, "The next big killer application for the INTERNET is education. It is going to be so big that it is going to make e-mail look like a rounding error". This actually reflects that e-Learning will be as common as traditional classroom learning, and is going to be the new frontier in education in the 21st century.

THE DEMAND OF KNOWLEDGE-WORKERS IN MALAYSIA

"In fiction and in reality, the beginning of a new century is linked to great changes."(Source unrecalled). Venturing into the 21st Century poses a great challenge to all especially developing countries like Malaysia. As the nation moves towards information-based economy in the era of ICT, there is a need to produce more skilled workers and more radically, the knowledge-workers (KW). There is a steady increase of knowledge-workers since the turn of the century. By the year 2005, the nation is targeted to have 35% knowledge-workers among its workforce. The following table depicts the growth of workforce and knowledge-workers in the nation.

Growth of Workforce & Knowledge-workers
(Source: Multimedia Development Corporation)



ICT AS AN AGENT OF CHANGE IN EDUCATION

To meet the changing manpower demands, the local universities and Institutions of Higher Learning have the tall order to produce graduates who are in specific, ICT-literate. Guskin (1996) has observed that on US campuses, the primary learning environment for undergraduate students is still fairly passive lecture format where students listen. This scenario is prevailing in our part of the world as well. In the principle of optimal settings for student learning, the institutions can effectively and efficiently apply the new ICT technologies in a way that will enhance and substitute their present method of teaching. In this way they will be able to spend more time with more students in activities that have a

greater impact on learning. Towards this end, these institutions are now more prevalent with the application of ICT to enhance student learning. The use of technology may vary from campus to campus, but all the institutions share the same belief that ICT can improve education on campus and off campus.

The advert of ICT technologies has an impact on skill development in students too. There are many skill areas where ICT technologies have become a major aid in reducing the time needed for human coaching by experts. Such innovations include software that simulates medical laboratories to train surgeons, to give doctors a "dry run" through risky procedures. Innovations in these areas could be a godsend to institutions of higher learning as well as a support for the e-Learning programmes that require similar facilities. However, there must be a balance between real hands-on and computer simulations. Bill Gates, the Microsoft giant has said something to this effect " … seeing chemical reactions on a computer screen can be a good supplement to real hands-on work in a chemistry lab, but it cannot replace the real experience."

The need to intensify efforts in increasing the supply of knowledge-workers has prompted our government to direct efforts to expand vocational and technical schools. Meanwhile, expansion at the tertiary level has also been implemented to increase the number of ICT graduates, as well as the setting up of research and development activities in line with the knowledge-worker requirement.

THE EMERGING TECHNOLOGIES

The three biggest emerging technologies that are making a difference in education and training, as categorised by Reinhardt (1995) are namely networking, multimedia and mobility.

Networking - this includes Local Area Network (LAN), Wide Area Network (WAN), the INTERNET and other online services such as email, forum and chatting. The technology advancement of the networking has improved the timeliness and ease of disseminating and sharing of information and course materials; it has also greatly improved communications between the fellow students and the teachers.

Multimedia - There is a wide range of technological options that are available to the e Learning educators. This encompasses voice, video, data and print.

Voice - Instructional audio tools include telephones, audio conferencing, tapes and radio.

Video - Instructional video tools include still images such as slides, pre-produced moving images such as films, and real-time moving images such as video conferencing.

Data - This includes

- Computer-assisted instruction (CAI) - uses the computer as a self-contained teaching tool
- Computer-managed instruction (CMI) - uses the computer to

organise instruction and track student records and progress

- Computer-mediated education (CME) - uses computer applications that facilitate the delivery of instruction, e.g. email, fax, World-Wide Web applications

Print - is a foundational element and the basis all educational delivery systems have evolved. Print formats include textbooks, study guides, workbooks, case studies and so on.

Mobility - is a combination of networking and portability. It is common to have notebook computers, ready-plug-in network points, wireless LANs for instant virtual workgroups or establish dial-in services that permits anytime-anywhere access to course materials and fellow students.

WHICH TECHNOLOGY IS BEST?

Institutions of Higher Learning offering e-Learning programmes should also focus on instructional outcomes, and not only the technology of delivery. It is without doubt that technology plays a key role in the delivery of the e-Learning. However, the key to effective e-Learning is focusing on the needs of the learners or the knowledge-thirsty, the requirements of the content and the constraints faced by the system. Appropriate technology can only be selected once these elements are assessed in details.

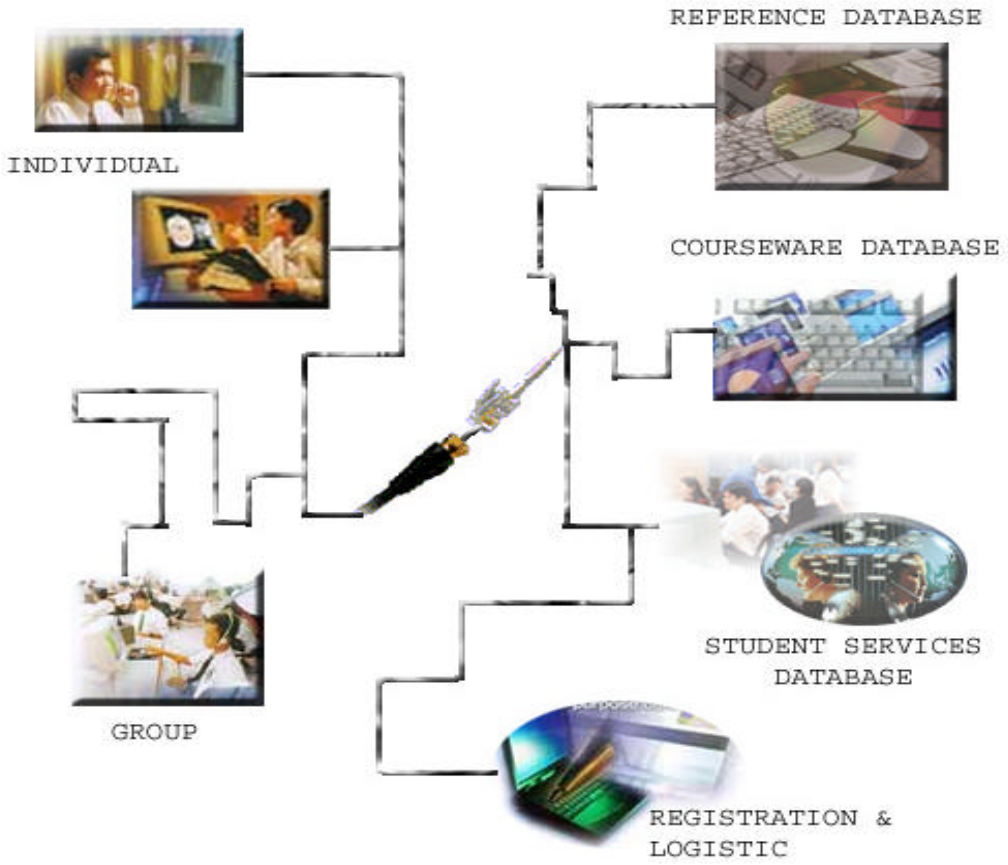
Selecting a delivery system for a typical e-Learning programme, a systematic approach will result in a mix of media, each serving a specific purpose. To quote a few examples:

- A strong print component can provide much of the basic instructional content in a form of course text, as well as reading.
- Interactive audio can provide face-to-face or voice-to-voice interactions.
- Email, forum and chatting can be used to send messages, assignment feedback, group discussion and so on.

Using the integrated approach, the task of the Institutions of Higher Learning is to carefully evaluate and select the technological option. The ultimate aim is to build a mix of instructional media meeting the needs of the learners in a manner that is instructionally effective and economically prudent.

SCHEMATIC DIAGRAM OF A GENERIC E-LEARNING SYSTEM

The following diagram depicts a generic e-Learning System



An individual or a group, equipped with a computer, linked to the Internet via the Internet Services Providers, would have access to the enrolled e-Learning programme. The e-Learning service provider (usually the Institution of Higher Learning) will have a computer system which houses the Course database, the Reference/Library database, the Student Service database and the Administrative Support (enrollment, payment, registration and so on) database.

THE KEY PLAYERS IN E-LEARNING

In order to fully integrate ICT technologies into learning, successful initiatives rely on the consistent and integrated efforts of the key players in e-Learning. They are the **faculty,** the **students** and the **administration.** To many, e-Learning may be a new paradigm and an overwhelming feeling yet to overcome. People have to open themselves up to the possibilities of doing things differently. Faculty and students have to re-engineer the teaching and learning processes.

The role of the faculty changes in tandem with the implementation of e-Learning. From the pronominally delivery mode of instruction, the faculty has to be more sensitive to students' need, and become more concerned with enhancing, guiding and facilitating student learning. The faculty has to function effectively as a skilled facilitator as well as content provider. To accomplish this, technology alone is not adequate. Besides changing the mindset, the faculty requires additional skills and training, new curricular material and the new educational model, which should emphasize on individualized hands-on learning, teamwork, guided discovery of information and exploratory learning, as well as the needs and expectations of multiple and diverse audience.

The primary role of the student is to learn. This is a daunting task, requiring motivation, planning and an ability to analyse and apply the instructional content being taught. With e-Learning, additional challenges result as students are often separated from others sharing their backgrounds and interests, have fewer opportunities to interact with the instructors outside of class and must rely on technical linkages to bridge the gap separating class participants. The e-Learning model would then require students to change their learning style. The students have to be active learners; they must also be more independent learners, attuning to the ICT-rich environment.

In terms of administration, the ICT technologies have to be harnessed to provide a responsive, user-friendly, easy to administer "one-stop" service center. The unsung heroes behind the administration are more than service people. They are also idea people, consensus builders, decision makers and referees. They would have to work closely with the faculty and technical support service personnel, ensuring that technological resources are effectively deployed to further the institution's academic mission.

THE MALAYSIAN E-LEARNING INITIATIVES

Our educational system starts with a compulsory six-year primary school, a five-year secondary school, a 2-year pre-university, follows by a 3-year degree course. The curriculum, except that at tertiary level, is standard throughout the nation. Consequently the syllabus of a particular subject is unlikely to change within short period of time and will be taught over years.

Transforming from production-based economy to knowledge-based economy requires our workforce to be more flexible and better trained, especially in the use of ICT. Moreover, in the era of information age, the life span of knowledge and skill is shorter. Other than attending classroom learning, e-Learning will be an excellent complement to our current education system. Our government has taken a lot of initiatives to increase the ICT literacy among the people. The Smart School Project and the National Education Network or "Jaringan Pendidikan", are two of the major projects that were launched. Under such projects, more schools are to be equipped with computers and linked to the Internet. Another commendable effort being put in by the government was the EPF withdrawal Scheme that allows contributors to make withdrawal for the purchase of the computers for personal use. Tax exemptions were also given to companies who incur expenses in providing new computers to employees. These are the efforts of the government to propel the rapid growth of computer adoption and widespread Internet usage throughout the country. The ultimate goal is to encourage all Malaysian to have at least one computer at each home.

The initiatives by the government in promoting wider usage of computers and enhancing the computer literacy have seen some fruitful results. The NUA Internet Survey reported that the current computer penetration in the country has reached 11%, while the Internet penetration has risen to 9%. At the end of 2000, there were over two million people who had Internet access in the country, an increase of 1.5 million since 1998.

In the tertiary education, more students are graduating in ICT related disciplines. Most of the local public universities like University Malaya (UM), University Sains Malaysia (USM), University Putra Malaysia (UPM), University Kebangsaan Malaysia (UKM) and University Technology Malaysia (UTM) have started to provide e-Learning courses for degree programmes. UPM has also started its online MBA programme. More universities are expected to follow suit.

University Tun Adbul Razak (UNITAR) has implemented its e-Learning course for degree, master and PhD programmes. The students can access course contents, lecture notes and submit assignments to their instructors online. However, the students have to attend examinations in the university campus to determine their final grades.

To date, there are 23 Private Institutions of Higher Learning in the country being accorded the Multimedia Super Corridor (MSC) Status by the government. This is a recognition of the quality effort and initiatives being put in by the institutions in the promotion and usage of the multimedia and ICT technologies, as well as the production of the knowledge-workers. Among these 23 colleges, three campuses under INTI Group of Colleges are accorded the MSC Status. INTI College Sarawak is the first organisation in East Malaysia to be accorded this prestigious award.

Other than the educational institutions, local companies are providing online short work-related professional courses as well as other educational courses. With the involvement of more parties in e-Learning, it creates competition among them that normally would result better e-learning programs at a competitive price. The knowledge-thirsty will be reaping the benefit.

BARRIERS AND CHALLENGES

It is without doubt that the success of any e-Learning project is very much dependent on the computer literacy and Internet access in the country. The concerted efforts put in by the government in this area is no doubt seeing results. However more has to be done. In the survey conducted by the National Information Technology Council (NITC), it was reported that approximately 1.2 million Malaysians are classified under the relative and hardcore poor categories and are "marginalized" in ITC terms. The survey also reported that with an individual Malaysian monthly earning of approximately RM2,000, purchasing computers and getting access to the Internet was a costly affair.

In the educational sector, the NITC survey reported that a total of 89.8% of primary and 66% of secondary schools did not have Internet access. 69.5% of primary and 46.2% of the secondary schools in the country did not even have access to personal computer facilities.

The level of awareness on emerging ICT technologies is especially low in the rural areas. Consequently, the digital divide between the urban and rural might be widening. The

challenge here is to provide infrastructure, ICT professionals, and basic computer Internet knowledge to all. This needs time and investments, and the onus should not be on the government alone, but the corporate citizens also need to actively support and participate.

The strategies adopted by the Institutions of Higher Learning and certain private organisations in promoting e-Leaning have increased both the breadth and depth of the learning environment. Usually more advanced technologies would have been deployed here. Jamie Switzer of Colarado State University distance MBA programme said: "We are moving toward video delivery of courses over the Web. We have the technology to do it; the problem lies with the students. Most do not have the hardware and software capability to receive the video over the Web." This strongly reflects one of the problems that institutions offering e-Learning have to deal with.

In the delivery of e-Learning programs, many local Institutions of Higher Learning would have established strategic alliances with foreign institutions. Foreign materials may lack local content and context, which are important elements. In addition, not all students in the country would have the necessary English language proficiency to fully benefit from the imported materials. This poses another challenge for both the institutions offering the e-Learning programmes as well as the students taking up the programmes.

In developing the e-Learning courseware outside resources may be utilized to enhance the learning experience of the students. These resources can range from a newspaper clipping to a multimedia presentation to a movie. All of these items and many other resources are copyrighted materials. Copyright law and intellectual property rights are extremely complex issues. In order to comply with the law in the area of copyright and proper use of copyrighted materials, the institutions ultilising them must be aware of the law and the parameters that govern proper use of copyrighted materials.

CONCLUSION

In Malaysia, higher education is an area ripe for the new ICT technologies. E-Learning is a new focus and it would be wise to "do things right" from the very beginning. As the planning and implementation process unfolds, there is much to learn from others, both locally and established institutions abroad, about their failures and successes.

The increase of computer literacy and usage will form a better foundation in providing e-Learning environment. The process of transformation to the new knowledge-based economy necessitates the management of change. There is always a rapid change and integration of the disciplines to meet new manpower demands as well as the changing contexts of learning brought about by technology. We are going to take the imitative to lead these changes and would not wait to be forced into them by external agencies. The government, the private sectors and foreign institutions from all over the world should work together to promote e-Learning and make Malaysia truly a **Centre Of Educational Excellence.**

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