Information Technology in Distance Education: Challenges and Strategies

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Abstract

Technological revolution brought on by the use of electronic media and information technologies has changed the situation of distance education today. This article presents issues and realities in coping with Information Technology (IT) in distance education. Each component in the information technology is individually discussed followed by the challenges and strategies that serve as perspective in ensuring the authentic contribution of information technology to the achievement of students and organization in distance education.

Abstrak

Revolusi teknologi yang dibawa oleh penggunaan media elektronik dan teknologi informasi telah menukar situasi pendidikan jarak jauh kini. Kertas kerja ini membincangkan isu dan realiti dalam menguasai teknologi informasi dalam pendidikan jarak jauh. Setiap komponen dalam pendidikan jarak jauh dibincangkan secara individu dan diikuti dengan cabaran dan strategi yang memberikan perspektif dalam menentukan sumbangan sebenar dalam teknologi informasi kepada kejayaan pelajar dan organisasi dalam pendidikan jarak jauh.

Introduction

Distance education, also known as distance learning is a form of education system or a learning situation in which learners are separated geographically from teachers and other educational resources. Traditionally the terms distance education and distance learning are applied interchangeably to a great variety of programmes, providers, audiences and medias with the commonality being the separation of educators and learners in space and/or time, and non-contiguous

communication between educators and learners, mediated only by prints or some forms of technology.

This article emphasises on distance education which we consider is inclusive of distance learning (role of student) and also distance teaching (role of instructor), and is a process of providing whatever educational opportunities needed by anyone, anywhere at any time. A successful implementation of distance education is a model which uses all available resources and evolves to incorporate emerging electronically mediated instructions including videos, audio-graphics, computer, multimedia technology, satellite and other forms of learning at a distance. With the advancement and rapid evolution of computer technologies in managing and processing information and a greater access to interactive technologies, the vision, design and implementation of distance education programmes have continued to provide great benefits and potentials for learners of all ages with additional educational choices and opportunities. The information technology which involves the use of electronic computers and computer software has thereby challenged the distance education system in obtaining boundless knowledge without increased budgets.

Colleges and universities worldwide face a new environment in which information technology is rapidly becoming part of the mode of teaching and learning. As distance education, distributed learning, virtual campuses and digital libraries generate greater interests amongst prospective students; academic institutions can no longer rely solely on traditional methods in their teaching and learning processes in order to prosper. This paper is to formulate a conceptual framework that will address the issues relating to the use of information technology in distance education such as the key elements, challenges, evaluation and assessment, prospect, strategy and future scenario.

Educational Tools

The earliest form of distance education was simply involved written words and printed modules which could now be mass-produced with great efficiency. With the development of audio and video tapes, instructional materials are available which relatively reduce the barrier of distance. The learner remains essentially enrolled in a correspondence course, but with

some useful supplement materials. The next great advances are the teleconferencing and videoconferencing in which distance learners and educators begin to be able to provide a fairly rapid feedback and bidirectional communication. The big change is the interaction factor with a passive transmission of academic information.

As computer networks expand, electronic mail is beginning to take hold as another alternative for communication between learners and educators, and among learners themselves. Perhaps more than any other distance media, the Internet and the World Wide Web are shaping the current generation of distance learning (especially in the developed areas), and virtual reality, artificial intelligence and knowledge systems may be next (Kerka, 1996).

IT and Distance Education

Distance education is facing an era of revolutionary change. This is due to the technological and communicational revolution brought on by the use of electronic media and information technologies. Even the range of interpretations of distance education runs from sending an educator some distance from the main campus to teach a group of students face-to-face, to providing all instructions via the World Wide Web. Between these two extremes lie several different paradigms. The current definition of the term interactive distance education usually includes physical separation of educator and student and the use of some technological delivery system. The advancements in multimedia, interactive programming and digital-based delivery systems have greatly advanced distance education development and the delivery options available to most universities. Information technology is indeed a powerful and ubiquitous force that will continually transform the instructional delivery methods of universities (Kansas State University, 1999). Its force is having, and will continue to have a profound impact on distance learning, which was once a poor and often "unwelcome stepchild" within the academic community. In fact, the accessibility of educational services is expanding due to these emerging delivery technologies.

Massy & Zemsky (1995) observed two trends emerging with distance learning. The first is the new demand for information technology-based teaching and learning and the second, is how profoundly it will change

teaching and learning. Additionally, Taylor & Swannell (1997) highlighted four different generations of distance education based upon the emergence and development in the application and delivering technologies. The first generation is widely regarded as the Correspondence Model followed by Multimedia Model which entails the use of highly developed and refined teaching-learning resources. The third generation is Telelearning Model and finally the emerging Flexible Learning Model which combines the benefits of high quality interactive multimedia.

The rapidity of technological development has various impacts on the teaching-learning process in distance education. Providers of distance education will need to carefully explore these changes, and make decisions which match their local resources, target audiences and institutional philosophy; and focus on what best fits their particular mission, goals and circumstances. If institutions could transform themselves in fundamental ways, they certainly are capable of reaping the greatest potential benefits that distance learning will offer to their systems.

The IT Framework

With the advent of technology, educators are now presented with challenges and decisions on how to incorporate this tool best in most instructions. These hurdles in utilising modern resources in addition to traditional approaches, involve the issues of time and effectiveness, instructional design and credibility of the new resources. The IT framework in Figure 1 comprises of several aspects which enables us to have insights into possible issues and realities for distance education programmes in the light of increasing technological trends. The main components of the framework are:

Key Elements

The expanding use of information technology in distance education more often lead to the instructional designers and curriculum developers enamoured of the latest technologies without dealing with the underlying issues of role and influence for example the infrastructure, the administrators or managers, the educator and learner support, and the financial impact brought upon the whole instructional process and delivery

systems in the implementation of the distance education programme. Thus the following key elements should be taken into consideration whenever information technology is to be incorporated within the distance education teaching and learning process.

Infrastructure

For an academic institution, the implementation of new technologies in a distance education programme challenges the rules, assumptions, designs for instructional and service delivery, organisational structures, and nearly everyone's expectations of what can realistically be provided within their limited capacities. The weight of these challenges can be counter balanced by gaining confidence and commitment to support technology use.

When an institution decides to embark onto a direction of a particular technology, a sound and solid organisational infrastructure is a prerequisite for success in the process of implementation in an effort to keep up with the demands of information flow. As Barnett (2000) highlighted, the first step to do is to have easy access to the technology adopted via two major components viz the availability and capability of the communication and information hardware and software systems.
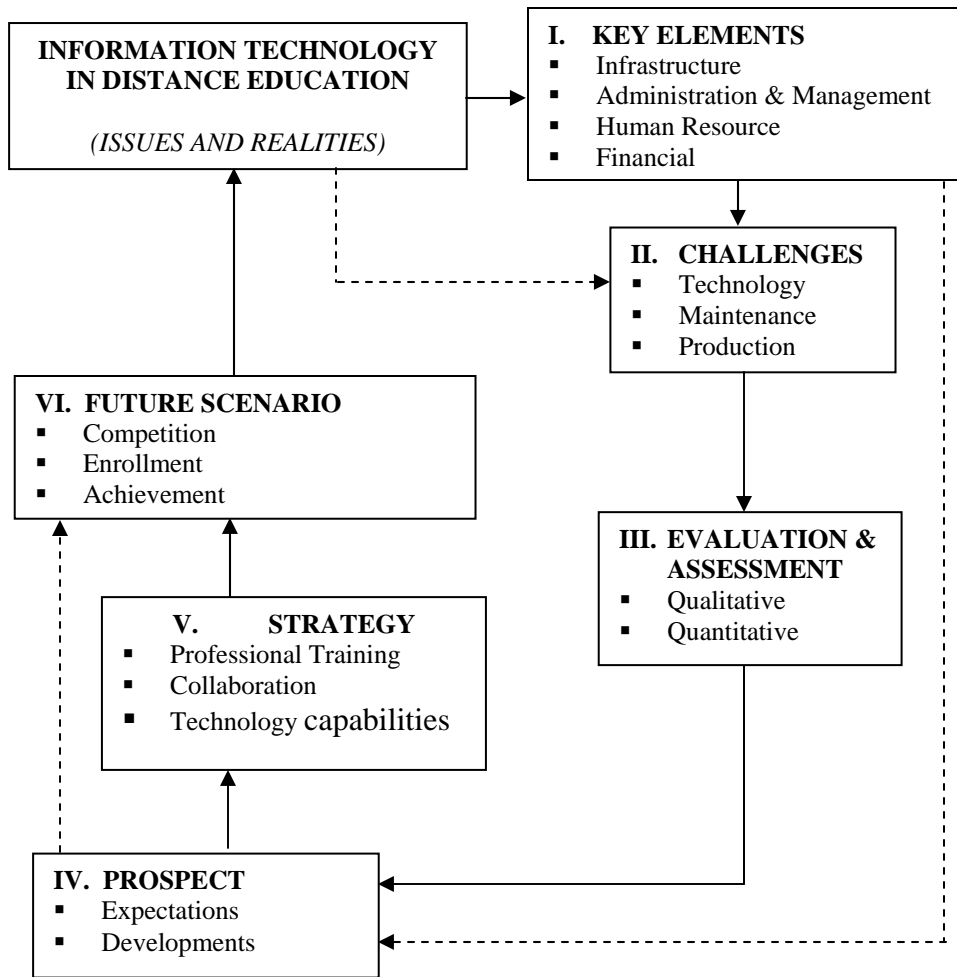
Figure 1   Information technology in distance education: A framework for future issues and realities

Administration and Management

Distance learning coordinators play a key role in assuring the effective use of emerging technologies in improving distance education. Resources of administrative processes and reliable incentives such as monetary rewards on a continuous basis, are the examples of essentials for an institution to explore for a success programme. Unwillingness to invest in the

technology and human resources needed to manage it, might result in a negative effort of marketing.

Gan (1998) pointed out that in terms of administration, technologies will have to be harnessed to provide more responsive, user-friendly and easy-to-administer systems for the full range of administrative processes, especially those involving students. With slick logistics and careful attention to details in all administration and management procedures, administrators and leaders of the institution will inadvertently recognise the support and training of information technology activities as an integral part of the change process. More importantly, this may innovate faculty members to eagerly participate, undertake and explore the challenges of working with the new technologies and delivery systems.

Human Resource (support)

First and foremost, educators themselves should establish a comfort zone with the technology for example being accustomed, confident and assuring a positive attitude towards the technology prior to assisting students in reaching their learning goals. Secondly is the support needed by the students to adapt to the new technology. Whether a distance learning programme grows or the direction it takes is accelerating, the progression comes most likely from the administration and faculty of the institution in providing the facilitation and encouragement to explore and establish relationships between information. The human touch will not certainly be replaced by technology, only the style of disseminating information may change from communicating and lecturing to effective guiding. Lacking sufficient support from either group will make the road rocky, if not impassable.

Financial

Consideration has to be given to significant investment of initial costs as well as to the continuing costs and resources up front of installing, maintaining, using and upgrading information technology to support distance services. Threlkeld & Brzoska (1994) suggested several cost component factors into the design of a distance education system which include :

- Investments in technology to fully access on-line resources of hardware and software applications.
- On-going expenses of leasing transmission access with sufficient network bandwidth and restructuring processes.
- Maintenance costs in repairing and updating equipment to assure overall quality.
- Broad-based planning of a foundational infrastructure with distributional network, powerful telecommunications and robust managing systems.
- Incentives, financial return or monetary reward for the production line for example the technological and personnel support for ongoing activities of material development.
- Miscellaneous expenses for the administrative structure and support network to ensure the system works efficiently and successfully including administrative costs, registration, advising, counseling, local support costs, facilities, overhead costs, etc.

In general, distance education initiatives must recover costs and explore innovative resource-generating applications of development, delivery and technology infrastructure use. However, the financial model for each specific distance education programme may differ depending upon the instructional model, the use of information technologies, faculty development, institutional infra-structure, and the number of institutions and/or programmes involved.

Challenges

A variety of factors will shape the distance education world as rapid technology discoveries and advances emerge. The resulting technology-based and technology-driven distance education will certainly bring challenges to the educational reform effort, and thus appropriate planning and implementation are essential to prevent the technology being underused, overused or misused.

The providers of distance education have three choices in addressing the role and challenges in advancing the educational reform through information technology. Concerning firstly the technology itself, they might ignore any reform movement and use the new distance learning

technologies to promote old ways of teaching and learning. Secondly, they might want to reflect the movement and provide the necessary maintenance of technological tools and information resources that support existing educational efforts. Or finally, the most excitingly and appropriately, they might embrace the challenge and lead the way in production by encouraging teachers and students to learn new things in new ways and provide models of distance education as catalysts for true advance technology-based educational change.

To address the related choices, each participating institution should be able to develop an efficient organisational structure to support and monitor the implementations of these policies.

Evaluation and Assessment

The use of information technology to overcome various barriers facing learners and their learning, should receive a high priority. Technology planners and implementers confront the biggest challenge in ensuring the benefits of technology to teaching and learning. Therefore what is needed is sustained research activities on a larger scale as an ongoing process of creation and transmission of new knowledge. Further research, evaluating and assessing their existing efforts in a systematic and compelling way, should be conducted to guide and improve practice and application.

Evaluation, being a data-driven process, can be quantitative or qualitative. Sun (2000) highlighted a basic technology evaluation process developed and deployed in an educational system. The focus was around concrete questions, visual indicators of performance and data that support a performance-based assessment. Subsequently, three critical issues in assessing the impact of technology on teaching and learning questioned on:

(i)   the positive effect of technology on student achievement,
(ii)   educators fluent with the technology tools, and
(iii) university allocation of the technology resources to best support all educators and students.

Significantly, technology evaluation work incorporates meaningful assessments which take a variety of factors into consideration and

transpire over time to define a realistic criteria for information technology use.

Prospects

While a variety of technologies have long been used in distance education, from prints to a combination of audios, videos and telephones, today's computer and Internet tools are in a whole different league. Such is the role of these tools in the education world that, not surprisingly perhaps, the students have extremely high expectations for the role they might play in improving education. These expectations also place a heavy burden on the shoulders of administrators and educators who must cut through the visionary rhetoric and focus in on the realities. The development of programes and practices that succeed should be based upon competent planning, effective delivery, user-friendly access and education quality (Jarmon et.al., 1998). It is critical that decisions and associated activities driven by the structure of information technology be promoted to determine the most efficacious approach to this lifelong learning.

Strategies

In realising the future of information technology in distance education, several strategies are essentially needed for bringing about the integration of technological learning environment into reality. The basis for the action agenda could include:

- professional training, orientation and development for staff and technical assistance, and time structure for collaborative activities of understanding, practicing and refining the technique adopt.
- communications with and support from people inside and outside of the institution to continue to develop innovative and competent technology programmes.
- cooperation (rather than competition), collaboration and partnerships between corporate, government and academic agencies to generate support through policies and fundings in advancing the potential and implementation of effective distance education.
- understanding of the technology's strengths and weaknesses, and plans for technical failures to ensure continuity of access.

Future Scenario

Engaging the capabilities of information technology to improve distance education, takes the combination of human energy, commitment, imagination and the spirit of collaboration that the whole enterprise requires. Thus, the effective use of technologies for learning relies heavily on an inclusive team and planning process, solid end-to-end strategy and total solutions approach. The developing and adapting of distance education technologies should basically challenges overall teaching and empathy for students. Here are a few ways of making the transition smoother:

- Improved planning and organising processes.
- Meeting student needs by increasing individualised learning.
- Effective incorporated teaching systems to stimulate and reinforce learning goals.
- Enhanced interaction and feedback for students and educators to think and communicate in a new way.
- Expand student skills by embedding learning in relevant context, critical thinking, goal setting, planning and self-monitoring.

Conclusion

Everyone agrees that distance education is the key to the future, but what does the future hold for distance learning in the new millenium? Although the prospects for distance education are justifiably promising, some problems in incorporating the technology advances do exist and must be resolved. This will require the cooperation of the institutions, government, administrators, educators and students. Further, with the continued mind-boggling pace of development of new technologies, the issues of financing technology plus instructional integrity also play the roles of thwarting or expanding the role of distance learning for future students.

A coordinated combined agenda, when implemented, will move the vision of distance education forward with a cohesive, integrated corpus of new knowledge. It is hoped that the framework presented above provides a basis for understanding the current and future critical issues arise from the rapid acquisition of information technology in distance education.

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