Interactive Multimedia Technologies for Distance Education in Developing Countries

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INTRODUCTION

With the extended application of information technologies (IT), the conventional education system has crossed physical boundaries to reach the un-reached through a virtual education system. In the distant mode of education, students get the opportunity for education through self-learning methods with the use of technology-mediated techniques. Accumulating a few other available technologies, efforts are being made to promote distance education in the remotest regions of developing countries through institutional collaborations and adaptive use of collaborative learning systems (Rahman, 2000a).

Distance education in a networked environment demands extensive use of computerized Local-Area and Wide-Area Networks (LAN/WAN), excessive use of bandwidth and expensive use of sophisticated networking equipment; in a sense this has become a hard-to-achieve target in developing countries. High initial investment cost always demarcates thorough usage of networked hierarchies where the basic backbone infrastructure of IT is in a rudimentary stage.

Developed countries are taking a leading role in spearheading distance education through flexible learning methods, and many renowned universities of the western world are offering highly specialized and demanding distance education courses by using their dedicated high-bandwidth computer networks. Many others have accepted a dual mode of education rather than sticking to the conventional education system. Research indicates that teaching and studying at a distance can be as effective as traditional instruction when the method and technologies used are appropriate to the instructional tasks with intensive learner-to-learner interactions and instructor-to-learner interactions. Radio, television and computer technologies, including the Internet and interactive multimedia methods, are major components of virtual learning methodologies.

The goals of distance education, as an alternative to traditional education, have been to offer accredited education programs, to eradicate illiteracy in developing countries, to provide capacity-development programs for better economic growth, and to offer curriculum enrichment in a non-formal educational arena. Distance education has experienced dramatic global growth since the early 1980s. It has evolved from early correspondence learning using primarily print-based materials into a global movement using various technologies.

BACKGROUND

Distance education has been defined as an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. Open learning, in turn, is an organized educational activity based on the use of teaching materials, in which constraints on study are minimized in terms either of access, or of time and place, pace, method of study or any combination of these (UNESCO, 2001).

There is no ideal model of distance education, but several are innovative for very different reasons. Philosophies of an approach to distance education differ (Thach & Murphy, 1994). With the advent of educational technology-based resources (CD-ROMs, the Internet, Web pages, etc.), flexible learning methodologies are getting popular to a large mass of the population who otherwise was missing the opportunity of accessing formal education (Kochmer, 1995). Murphy (1995) reported that to reframe the quality of teaching and learning at a distance, four types of interaction are necessary: learner-content, learner-teacher, learner-learner and learner-interface. Interaction also represents the connectivity the students feel with their professor, aides, facilitators and peers (Sherry, 1996). Responsibility for this

sort of interaction mainly depends upon the instructor (Barker & Baker, 1995).

The goal of utilizing multimedia technologies in education is to provide learners with an empowering environment where multimedia may be used anytime, anywhere, at a moderate cost and in an extremely user-friendly manner. However, the technologies employed must remain transparent to the user. Such a computer-based, interactive multimedia environment for distance education is achievable now, but at the cost of high bandwidth infrastructure and sophisticated delivery facilities. Once this has been established for distance education, many other information services essential for accelerated development (e.g., health, governance, business, etc.) may be developed and delivered over the same facilities.

Due to the recent development of information technology, educational courses using a variety of media are being delivered to students in diversified locations to serve the educational needs of the fast-growing populations. Developments in technology allow distance education programs to provide specialized courses to students in remote geographic areas, with increasing interactivity between student and educator. Although the ways in which distance education is implemented differ remarkably from country to country, most distance learning programs rely on technologies that are either already in place or being replicated for their cost effectiveness. Such programs are particularly beneficial for the many people who are not financially, physically or geographically able to obtain conventional education, especially for participants in the developing countries.

Cunningham et al. (2000) referred in their report that "notwithstanding the rapid growth of online delivery among the traditional and new provisions of higher education, there is as yet little evidence of successful, established virtual institutions." However, in a 2002 survey of 75 randomly chosen colleges providing distance learning programs, results revealed an astounding growth rate of 41% per program in the higher education distance learning (Primary Research Group, 2002). Gunawardena and McIsaac (2003), in their *Handbook of Distance Education*, has inferred from the same research case that, "In this time of shrinking budgets, distance learning programs are reporting 41% average annual enrollment growth. Thirty percent of the programs are being developed to meet the needs of professional continuing education for adults. Twenty-four percent of distance students have high-speed bandwidth at home. These developments signal a drastic redirection of traditional distance education." According to an estimate, IT-based education and the e-learning market across the globe is projected at $11.4 billion (United States dollars) in 2003 (Mahajan, Sanone & Gujar, 2003).

It is vital that learners should be able to deal with real-world tasks that require problem-solving skills, integrate knowledge incorporating their own experi-

Figure 1. Communication/management hierarchy of open learning system