Role of Information Technology in Education System: By Faculty Prospective

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Abstract

The main objectives of the paper are to evaluate the importance of IT in higher education and to analyze the government initiatives for development of IT in higher education. Much recent educational research focuses on teaching and learning within classroom conversations. This raises the question of the role of IT as a support for such conversations. The central argument of this paper is that the dual nature of computers, as machines (objects) which can be made to act as if they were people (subjects), allows them to play a potentially distinctive and valuable role within educational conversations. This role is to resource and, at the same time, to frame and direct, learning conversations amongst small groups of children. The use of IT in education lends itself to more student-centered learning settings and often this creates some tensions for some teachers and students. But with the world moving rapidly into digital media and information, the role of IT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. Thus, the paper suggests that IT in higher education is not a technique for educational development but also a way of socio-economic development of the nation.

Information technologies help in promoting opportunities of knowledge sharing throughout the world. These can help the teachers and students having up-to-date information and knowledge. Accurate and right information is necessary for effective teaching and learning; and information technologies (Haag, 1998; p.10) are "set of tools that can help provide the right people with the right information at the right time." Students are independent and they can make best decisions possible about their studies, learning time, place and resources. Students are able to work in collaborative and interactive learning environments effectively communicating, sharing information and exchanging ideas and learning experiences with all in the environment.

Keywords: *Information Technologies; Teaching Learning Process; Computers; Knowledge Explosion; Media; Distance Education.*

Introduction: Computers and related technologies are now in almost every school across the nation. State reform efforts include the integration of technology in curriculum standards and sometimes make technology skills a separate standard for students to achieve. As the focus on technology expands, policy makers and tax payers are asking researchers in educational practice to provide the data for thoughtful decision making on the use of technology for learning. At this time the decision-making is often hampered by the lack of adequate research, although there is considerable work from previous years to guide future study. The computer was introduced into education in the 1970s and its first use had teachers and students learning to program. Since that time there has been an evolution of best practices. As software gained in sophistication, the computer became the tutor or surrogate teacher. Students followed the commands on the computer screen receiving rewards for correct answers. They also began to learn through playing games and simple simulations. Teachers of writing discovered the value of using a word

processor and soon students were writing more and revising with ease. Other teachers saw the value of the computer in creating a rich learning environment and had students using databases, spreadsheets, and presentation and research tools across all subject areas. Next the Internet impacted technology use. Suddenly there was a volume of knowledge available to students with access and a network of people throughout the world that enhanced communication and the exchange of ideas. Real problem solving in collaborative groups became the norm in some classrooms. Online courses were available and students in rural areas had expanded learning opportunities in a variety of subject areas. Previously abstract concepts could now be illustrated and manipulated because of technology advancements. A whole new learning environment became possible. One of the basic functions of education is preparation of students for life. This function in 21st century may be participation in an information rich society, where knowledge is regarded as the main source for socio-cultural and politico-economical development of countries and/or nations. Information rich societies are developed and dominating and they are controlling the information throughout the world. Information encompasses and relies on the use of different channels of communication, presently called information and communication technologies (Hussain, 2005) and would be incorporating better pedagogical methods to cope with such emerging situations These have changed the scenario of education particularly, pedagogy and instruction making teaching learning process more productive creating collaborative, learner centered and interactive global learning environments. Therefore, information technologies are assumed to play a constructive role in education to make the teaching and learning process more productive through collaboration in an information rich society. Information rich society promotes new practices and paradigms for education where the teacher has to play new role of mentoring, coaching and helping students in their studies rather to play the conventional role of spoon feeding in the classrooms. Students can learn independently having a wide choice of programme selection and access to information. Students can be involved in skill oriented activities in group learning environments for accumulated knowledge. They can interact and share learning experiences with their teachers and fellow learners in knowledge construction and dissemination process. They can receive and use information of all kinds in more constructive and productive profession rather depending upon the teacher. Branson (1991) stated that students learn not only by the teacher but they also learn along with the teacher and by interacting with one another. Indeed, now students can learn much more than that the teacher teaches in conventional learning environments. For productive teaching learning process teachers and students have to use information technologies according to their requirements and availability.

Information Technologies: Information Technology "is any computer-based tool that people use to work with information and support the information and information processing needs of an organization" (Haag. 1998; pp.17. 518). It includes computers and its related technologies; WWW, Internet and Videoconferencing etc. Information technology can be used to promote the opportunities of knowledge dissemination. It can help the teachers and students having up-to-date information and knowledge. Accurate and right information is necessary for effective teaching and learning; and information technology (Haag, 1998; p.10) is a "set of tools that can help provide the right people with the right information at the right time." In this sense, information technologies may the result of knowledge explosion, where according to Marriam, and Cafarella, (1997, p.15) "computer technology (software) extends the mental ability." Therefore, information technologies may include computer and its related technologies of high tech and low touch nature. Charp, (1994) called them emerging technologies and stated that these are the products coming out of laboratory and into the hands of educational community.

These include wireless communications, the information highway, asynchronous mode, integrated services digital networks (ISDN), multimedia applications, personal digital assistants, artificial intelligence and virtual reality. These technologies would be big of brain and small of mass, depending upon computer technology for their effectiveness and increased capabilities. Similarly, Rashid, M. (2001) discussed the interactive video, CD-ROM, compact video disc, Internet, WWW, teleconferencing, computers, satellites and e-mail as emerging information technologies, and according to him these are "current technologies incorporating into the teaching learning environment [process]" (pp.301-338).

Technology Enhances The Teaching And Learning Of Statistics: Having the vision to see what technology can, or might, do is not synonymous with knowing how to take advantage of this in a teaching context. The reality is that we still have much to learn about the use of technology. Technology-based teaching may be less than optimal because (1) either the hardware, the software, or both, may be inadequate; (2) our use of the technology may be inappropriate; or (3) the students may not experience what we think they do. Some statistical packages are particularly dangerous with respect to their graphics capabilities. For example, the same command may be used for producing histograms and bar-charts. This does not help learners who are already confused by the superficial similarities between these two diagrams. Labeling on diagrams may be minimal or simply incorrect, and there are obviously problems with packages that emphasize pretty or impressive, rather than accurate, graphs (e.g., auto-scaling may preclude realistic perceptions of magnitudes). Technology can enhance the processes of teaching and learning statistics. However, not all technology is fit for this purpose, and the use we make of this technology is not always appropriate.

Computers Have Changed The Way We Do Statistics: It is certainly the case that computers have changed the way that some students do statistics. Now, if unchecked, students have the resources to collect too much data, with little thought as to why it has been collected, and to produce vast numbers of meaningless analyses! It is also fair to say that computers have expanded the range of processes that statisticians can use to collect, explore, and interpret data. Clearly, technological developments since the late 1970's have been significant, and they have had an impact on what students will experience as "statistics." The evolution of more powerful computers has resulted in the development of new methods of statistical analysis and has made the implementation of some previously suggested techniques a reality, particularly in the realms of graphical displays and multivariate analysis.

Computers Have Changed The Way We Teach Statistics: Computers have saved many hours of computation time, enabling the study of larger datasets than was previously possible. New topics have been added to statistics syllabi, and some techniques that were mainly ways of coping with awkward or time-consuming computations have been dropped. Statistics, of course, is a living subject; thus, the process is on-going. It has not, however, been computers per se that have changed the way we teach statistics. More particularly, it was (1) the micro-revolution (Mangles, 1984) that made computers physically available to a wider range of users, and (2) the development of natural language and Graphic User Interface software that made their use accessible. The advantages of computers include their dynamic nature, their speed, and the increasingly comprehensive range of software that they support. These, together with their increased storage capacity and processing power, enable students to experience and explore all aspects of the statistical process—from planning the sampling or experimental design, through

data collection, database management, modeling, and analysis, to interpreting and communicating findings. Technology can now provide students the opportunity to conduct real investigations of real questions of real interest.

In teaching statistics, it is no longer necessary to spend time on ways to make manual computations easier, or on practicing such computations. There are, however, a number of dangers into which statistical educators can fall. Preece (1986) warned against filling the time made available by the use of computers with opportunities "for students to 'try out' a whole host of packages whose merits or failings they are not yet competent to assess" (p. 43). Computers assist us: It is statistics that we are teaching--not computing. Taylor (1980) defined three types of computer software for use in teaching statistics: introducing technology into the statistical teaching process is innovative: Again, this is not really the whole story. Introducing technology effectively requires exactly the same kind of planning and understanding about how students learn, and how best to teach them, that we should use to plan any other non technologically-based teaching. It also requires empirical evidence about the optimal materials to be used, the methods for presenting them and how to integrate them into the overall teaching process.

Students Learn Statistics More Easily With Computers: There is a large selection of software available for demonstrating probability and sampling distributions. A noticeable feature of the Second International Conference on Teaching Statistics (ICOTS-2; Davidson & Swift, 1986) was the enthusiasm of many delegates for demonstrating newly developed examples of central limit theorem software. It is somewhat surprising that new examples of this are still being produced, when there is an established collection already and when the new examples add little in terms of content or pedagogy to the earlier offerings. The contributions to statistical computing sessions at the Third International Conference on Teaching Statistics (ICOTS-3; Vere-Jones, 1990) were more varied in their content, which indicates the progress in this area. This progress has, by and large, been sustained in subsequent meetings of the International Statistical Institute (ISI) and the International Association for Statistical Education (IASE). However, software to simulate statistical distribution theory is still a popular teaching resource, and this type of software may be the only reason why some teachers use the computer in teaching statistics.

Technology Will Solve Students' Statistics and Probability Misconceptions: Technology may be able to help us find some solutions, but not until we have a better understanding of the origins of those misconceptions and we have found optimal ways to address them. Even then, only some of the misconceptions that students have will be particularly amenable to technology-based prevention or cures.

It is one thing to claim that more dynamic and interactive software can allow students to gain insights by exploring and experimenting with statistical concepts. It is quite another to find empirical evidence of how, why, and when these enhanced insights are gained. As statisticians, we are aware that the media, our policymakers, members of the general public, our students, and even ourselves on occasions, are prey to many statistical and probabilistic misconceptions. Some of these misconceptions seem to be reasonably easy to address. Research shows, however, that others remain deep-seated and resistant to change. In fact, it is not only peoples' misconceptions that we need to worry about. To be statistically literate, a person must have not only reliable understanding, but also an inclination for using that understanding in everyday reasoning. It remains to be seen how much the use of technology can solve peoples' misconceptions, let alone encourage them to modify their reasoning strategies at such a fundamental level.

IT and Higher Education: Education is perhaps the most strategic area of intervention for the empowerment of girls and women in any society and the use of information technologies (ITs) as an educational tool in the promotion of women's advancement has immense potential. The application of ITs as a tool for effective enhancement of learning, teaching and education 33 management covers the entire spectrum of education from early childhood development, primary, secondary, tertiary, basic education and further education and training. Integrating IT in teaching and learning is high on the educational reform agenda. Often IT is seen as indispensable tool to fully participate in the knowledge society. ITs need to be seen as "an essential aspect of teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place" (Leach, 2005). For developing countries like Vietnam, IT can moreover be seen as a way to merge into a globalizing world. It is assumed that IT brings revolutionary change in teaching methodologies. The innovation lies not per se in the introduction and use of IT, but in its role as a contributor towards a student-centered form of teaching and learning. The Information Technology (IT) curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies, and the impact of IT on self and society. Technology is about the ways things are done; the processes, tools and techniques that alter human activity. IT is about the new ways in which people can communicate, inquire, makes decisions and solves problems. It is the processes, tools and techniques for:

1. Gathering and identifying information

2. Classifying and organizing

3. Summarizing and synthesizing

4. Analyzing and evaluating

5. Speculating and predITing

Enhancing and upgrading the quality of education and instruction is a vital concern, predominantly at the time of the spreading out and development of education. ITs can improve the quality of education in a number of ways: By augmenting student enthusiasm and Commitment, by making possible the acquirement of fundamental skills and by improving teacher training. ITs are also tools which enable and bring about transformation which, when used properly, can encourage the shift an environment which is learner-centered.

IT in Research: The most straightforward use of ITs in research is in data processing. The unprecedented growth in bandwidth and computing power provide opportunities for analyzing/processing huge amounts of data and performing complex computations on them in a manner that is extremely fast, accurate and reliable. Computer data processing not only frees researchers from the cumbersome task of manually analyzing data but more importantly facilitates quick and accurate analysis of huge amounts of data from national samples or even multi-national samples covering tens of thousands of respondents. Another important dimension of IT in research is the use of online full text databases and online research libraries/virtual libraries which are the direct outcome of the growth in telecommunications networks and technology. These databases and libraries provide researchers with online access to the contents

of hundreds of thousands of books from major publishing houses, research reports, and peer-reviewed articles in electric journals.

IT in Teaching: Academics have taken to the use of computer in teaching much more readily than they adopted earlier audio-visual media. This is because the strength of computers is their power to manipulate words and symbols - which is at the heart of the academic Endeavour. There is a trend to introduce eLearning or online learning both in courses taught on campus and in distance learning. Distance education and eLearning is not necessarily the same thing and can have very different cost structures. Whether eLearning improves quality or reduce cost depends on the particular circumstances. IT in general and eLearning in particular have reduced the barriers to entry to the higher education business. Countries and those aspiring to create new HEIs can learn from the failures of a number of virtual universities. They reveal that ITs should be introduced in a systematic manner that brings clarity to the business model through cost-benefit analyses. ITs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies—scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus.

Benefits and Challenges of IT: Tools are now available on the Internet to assist both teachers and students to manage writing assignments to detect and avoid the pitfalls of plagiarism and copyright violations. One of the great benefits of IT in teaching is that they can improve the quality and the quantity of educational provision. For this to happen however, they must be used appropriately. While using IT in teaching has some obvious benefits, ITs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ITs. While potentially of great importance, the integration of ITs into teaching is still in its infancy. Introducing IT systems for teaching in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g., buildings) are relatively less costly The four most common mistakes in introducing ITs into teaching are: (i) installing learning technology without reviewing student needs and content availability; (ii) imposing technological systems from the top down without involving faculty and students; (iii) using inappropriate content from other regions of the world without customizing it appropriately; and (iv) producing low quality content that has poor instructional design and is not adapted to the technology in use. The other challenge faced is that in many developing nations the basic requirement of electricity and telephone networks is not available. Also many collages do not have proper rooms or buildings so as to accommodate the technology. Another challenge is that the teachers need to develop their own capacity so as to efficiently make use of the different ITs in different situations. They should not be scared that ITs would replace teachers English being the dominant language most of the online content is in English. This causes problems as in many nations the people are not conversant or comfortable with English.

Concluding Observations: As move into the 21st century, many factors are bringing strong forces to bear on the adoption of IT in education and contemporary trends suggest will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities and affordances of IT. It is believed that the use of IT in education can increase access to learning opportunities. It can help to enhance the quality of education with advanced

teaching methods, improve learning outcomes and enable reform or better management of education systems. Extrapolating current activities and practices, the continued use and development of ITs within education will have a strong impact on: What is learned, how it is learned, when and where learning takes place, & who is learning and who is teaching. The continued and increased use of ITs in education in years to come, will serve to increase the temporal and geographical opportunities that are currently experienced. The integration of IT in higher education is inevitable. The very high demand for higher education has stimulated significant growth in both private and public provision. ITs in the form of Management Information Systems are increasingly universal. The strength of computers in teaching is their power to manipulate words and symbols - which is at the heart of the academic Endeavour. IT has also led to the emergence of Open Educational Resources (OERs). The use of IT creates an open environment which enables the storage and the reuse of information materials as also it enables the interface among the teachers as well as students. Apart from having enabling telecommunications and IT policies, governments and higher education institutions will need to develop strategies for effective IT and media deployment and sustainability.

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