CONTINUOUS TECHNICAL SUPPORT FOR THE EFFECTIVE WORKING OF E-LEARNING IN HIGHER EDUCATION

Allah Nawaz, Muhammad Siddique

Department of Public Administration, Gomal University, Dera Ismail Khan, KPK, Pakistan

E-mail of Corresponding Author: mpasiddique@yahoo.com

ABSTRACT

The adoption of information and communication technologies (ICTs) is no more an option for the higher education intuitions (HEIs) rather indispensable to their survival in both developed and developing states. For the later, technologies hold unprecedented opportunities however; successful implementation of educational technologies squarely depends on the ability of developers and users in harnessing modern digital-gadgets to stay available and accessible 24/7. If the required technical infrastructure (tools and professionals) and live help-desks are not there, eLearning solutions in higher education continue underplaying their role as well as discouraging the users from becoming digitally literate. This paper underlines the role and significance of sustained technical support for successful implementation of eLearning projects in HEIs of the developing states.

Keywords: ICTs, Educational Technologies, eTeaching, ePedagogy, eLearning, eEducation, eReadiness, eMaturity, LMS, LCMS, ERP, CMS.

INTRODUCTION

ICTs have created a new global economy "powered by technology, fueled by information and driven by knowledge."1 The emergence of this new global economy has serious implications for the nature and purpose of educational institutions (Tinio, 2002). However, the success of the project depends on the skills and quality of technical support available to the users (Gray et al., 2003). Immediate, extensive, and sustained support should be offered to teachers in order to make the best out of e-learning (Abrami et al., 2006). They need to get technical and human resource support for continuous technology integration after having training (Zhao & LeAnna-Bryant, 2006).

It is however notable that global availability of educational technologies have staged a platform of opportunities for all the HEIs in the world (Tinio, 2002) and these are more profitable for the developing countries in terms of solving their long standing education issues along with other economic and political problems. eLearning is helping the developing nations to solve their problems of mass-education, which has not been possible through physical education facilities at that large scale (Hvorecký et al., 2005). Similarly, ICTs are helping developing states in reducing their isolation from rest of the world by connecting online through internet and thereby learn, enjoy, do business or politics (Sife et al., 2007).

It is argued that without proper technology support even the most current and sophisticated hardware and software cannot help teachers and students to access and use technology effectively (Valdez et al., 2004). Similarly, research reveals that there is communication and knowledge-gap between developers and users in adopting the new systems (Nawaz et al., 2007). Other researchers report that the successful development of online programs

means providing adequate levels of pedagogical guidance and technical support (Phillips et al., 2008).

Unfortunately, educational technologies do not 'go-live' as and when they are purchased by the users or organizations. They have to be harnessed and tamed (Stephenson, 2006) in accordance with the requirements of the user and work-environment. There is a long list of digital technologies and all are not good for every institution rather there needs to be a rational choice of relevant hardware, software and networking facilities (Nyvang, 2006). The universities in developing states face a lot of challenges in undertaking such a process like lack of systemic approach to ICT implementation, awareness and attitude towards ICTs, administrative support, technical support etc., (Sife et al., 2007). Furthermore, there are documented differences between the success and failure factors in the developed and developing countries with regard to the development and use of eLearning in HEIs (Nawaz & Kundi, 2010).

In the developing states, educational technologies are not the problem in themselves rather their availability and then their taming for the individual and organizational requirements is challenge for both the developers and users. The biggest technological issue for the countries like Pakistan is the creation of country-wide digital infrastructure, facilities and services at every HEI level (ADB, 2002; Hameed, 2007). At the institutional level, the widely reported technological problems relate to the existence and support of technical unit in the institute. Users need continuous and timely help from the technical department, which is reportedly mostly unavailable (Moolman & Blignaut, 2008). Thus the dependence on the technical department and staff is a big issue for the eLearning users.

EDUCATOINAL TECHNOLGIES IN HEIS

Education is the major user of software applications therefore teachers must join and

contribute to the efforts for making eLearning projects a success (Buzhardt & Heitzman-Powell, 2005). High-quality ICT-literacy teaching requires the administration to provide support for faculty by adequately funding the staffing of IT services personnel to levels that can accommodate the demands placed upon them (Ezziane, 2007). Information Technology is currently being used effectively in management education for information access and delivery in libraries, research and development, as a communication medium, and for teaching and learning. Increased access to and use of the Internet is making a unique contribution to the teaching and learning process and will be an important part of future strategies to provide services to increased number of students in very diverse locations (Mehra & Mital, 2007).

An eLearning solution for a HEI is made of three basic components: Content, Technology and Services (Dinevski & Kokol, 2005).

1. **Content**: In the eLearning environment, new forms of educational content (radio programs, web-based courses, interactive multimedia, etc.) are developed, existing contents are adapted and print-based content are converted into digital media (Tinio, 2002). The trend of the learning content development is its interactivity and to serve the learners with different background knowledge (Dinevski & Kokol, 2005). In the eLearning environments, learning-contents are delivered via internet, intranet, extranet, satellite TV, and CDs, using web-based learning, virtual classrooms and digital collaboration (Manochehr, 2007).

2. **Technology**: Technology comprises the: 1 Infrastructure (Internet, Intranet or hybrid delivery platforms), facilities for offline and remote access, user interfaces and personalization; 2 Learning content management systems (LCMS) (delivery, tracking, management and reporting of online content); 3 Learning management systems

(LMS) (mapping, performance management, employee development plans, financial and activity tracking/reporting, system integration); 4 Learning technologies (mentoring, chatting & discussion forums, Web seminars, online meeting and classroom sessions (Pfeffer, 2004; Dinevski & Kokol, 2005; Dalsgaard, 2006; Barnes et al., 2007).

3. **Services**: Services include:

a. Consulting (developing the strategy and design of the eLearning program);

b. Support (assistance with implementation of the eLearning program (technology platforms and infrastructure, management feedback and reporting, technical and implementation support);

c. Design & build services (building custom contents for a specific education, transfer existing materials to online format, tailoring and customization of the eLearning platform and delivery environment, and integration with other applications (Dinevski & Kokol, 2005).

ROLE OF TECHNICAL SUPPORT

Technical support is essential both for the teachers and students (Sirkemaa, 2001). For teachers, technical support is needed to ensure that they have the resources and skills necessary for technology-integration into the class practices. For students, technical support helps in the acquisition of knowledge and skills necessary to fulfill their unique curriculum requirements (Valdez et al., 2004). Technical support includes "installation, operation, maintenance, network administration and security (Sife et al., 2007)." The ICT support covers resolving hardware problems, implementing software installations and helping users in common applications of ICTs in eTeaching, eLearning and eEducation (Mokhtar et al., 2007).

Technological sustainability involves choosing technology that will be effective over the long term (Tinio, 2002). Gray et al., (2003) report, after studying a group of universities running successful eLearning projects, that "the success of the project was often dependent on the skills and quality of technical support provided to end-users." Similarly, researchers suggest that the university constituents "need to get technical and human resource support for continuous technology integration after the training (Zhao & Bryant, 2006)." This support includes the technical-infrastructure manned with technical talent such as network managers, web administrators, security specialists etc., but universities are facing challenges in preparing IT-workers for new digital environments (Ezziane, 2007).

Despite help from the IT centre most problems need to be solved at teachers or students level. Interestingly, student survival in the digital age seems to depend on how well one knows people who can help with different problems (Sirkemaa, 2001). Because, support to eLearning does not simply refer to bridging the hardware-divide rather the access to infrastructure and services should help users in getting knowledge, skills, and consistent support of organizational structures to achieve broader social and community objectives (Macleod, 2005; Ågerfalk et al., 2006). Technical support is an important part of the implementation and integration of ICT in education however, often technical support is not available requiring the teachers and students to command some basic troubleshooting skills to overcome technical problems when using ICTs (Sife et al., 2007).

Development, Maintenance & Up-gradation of Infrastructure

A strategic plan for educational technology includes the technological infrastructure and the roadmap according to which new technologies will be adopted in the teaching and learning practices (Stockley, 2004). For this purpose, it is necessary to establish an infrastructure, which is reliable and loaded with interoperable repositories, publishing support services and quality control mechanisms (Pfeffer, 2004). Likewise, there is need to invest significantly in the central support like helpdesk, training, documentation, registration,

authentication etc (Valcke, 2004). Because high-quality digital literacy requires the HEIs to provide support to the faculty by adequately funding the IT department and professionals so that they can accommodate the demands placed upon them (Ezziane, 2007) thereby showing eMaturity in using ICT tools and techniques (Moolman & Blignaut, 2008).

In the digital age technology is changing fast. The result is that compatibility and flexibility to adapt to different devices and platforms are important issues in infrastructure (Sirkemaa, 2001) because reliability of equipment means that technical support staff can spend less time on maintenance and much more time for training teachers and students in the use of software (Lewis & Goodison, 2004). Furthermore, the adoption and maintenance of educational technologies is also expensive. The capital cost of the entire infrastructure needed to initiate the process is quite obvious. A little less obvious is the high level of recurrent costs associated with the effective use of ICT (Ezziane, 2007).

IT-Department & Personnel

Whether provided by inside technical staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school. General competencies that are required for eLearning technical experts are installation, operation, and maintenance of technical equipment (including software), network administration, and network security. Without on-site technical support, much time and money may be lost due to technical breakdowns (Tinio, 2002). The success of an eLearning project is often dependent on the skills and quality of technical support provided to end-users (Gray et al., 2003) by "IT division (Juniu, 2005)." In the universities, eLearning environment requires technical staff like network managers, web administrators, e-commerce developers, and security specialists. The number of graduates in computer science and information systems is

inadequate to meet worldwide demand of professionals (Ezziane, 2007).

Technical staff builds and maintains the system architecture as well as assists the teachers and students in using this system (Sirkemaa, 2001). The effectiveness of technology support is measured by the degree to which end-users feel their availability. In other words, when systems and resources operate seamlessly, users tend to take the staff supporting their technology use for granted. In many cases, the only interaction between technical staff and users occurs when technology gives problems (Valdez et al., 2004). It is argued that current eTeachers deserve better technical support of technology experts and integration specialists who can help in classroom technology integration through a kind of mentoring (Zhao & Bryant, 2006).

Bottlenecks of sustained technical support

Bringing computers into the classroom is relatively easy but keeping them working is a greater challenge (Hawkins, 2002) because developing and implementing a strategic plan that includes educational technology is often a difficult and complex process (Stockley, 2004). HEIs are also very preoccupied with the rate of technological change and its increasing cost over time (Sasseville, 2004). In most of the developing countries there is insufficient technical support (Mokhtar et al., 2007) with very few technical experts (Sife et al., 2007).

Across the literature, certain issues surface over and over in all the surveys of HEIs in developed and developing countries such as, changing technologies, leading-edge syndrome, and users' digital literacy (Hawkins, 2002; Klonoski, 2005; Mokhtar et al., 2007). An information system is not just built and thereafter operates without any interruption rather research has unfolded several technology-centric attitudes, human problems, cultural conflicts, and political maneuvering specific to the success and failure of an eLearning system (Nawaz et al., 2007).

System Compatibility

In the digital age technology is changing fast therefore compatibility and flexibility to adapt with changing gadgets and platforms are important issues in the infrastructure of eLearning (Sirkemaa, 2001). Given the rapid changes in ICTs, this becomes indispensable for professionals to fight the "threat of technological obsolescence (Tinio, 2002)." Likewise, in a developing country, a list of problems (relating to spikes, viruses, dust, heat, and wear-and-tear) can bring "the computer lab to a screeching halt (Hawkins, 2002)." Having said that, in developing countries HEIs have to be in the forefront of ensuring ICT revolution, but they are unable and ill-prepared to play such a leadership role because of having poorly developed infrastructure (Sife et al., 2007). A system needs to be capable of being changed throughout its life (Nawaz et al., 2007; Nawaz & Kundi, 2010b).

Issues of Latest Technologies

The problem of 'leading-edge-syndrome' is negatively affecting the organizations around the globe (Tinio, 2002). It is the selection of cutting-edge technologies for eLearning projects. Although research warns again and again that 'tested technologies' are better than the new and untested ones, most of the institutions still opt for latest technologies, which are not only sophisticated& complicated but also expensive. The research suggests that most of the time these 'leading-edge' technologies turn into 'bleeding-edge' technologies because of costs overruns, delays and issues of their integration with the existing systems (Ezziane, 2007). An effective technical support also means that users are not only trained in using technologies but continuously updated about the user and possibilities created by these gadgets (Kopyc, 2007).

Digital Literacy of the eLearning Users

The demand for a universal computer-literacy stems from the ways in which ICTs are dominating different aspects of the contemporary life and work (Oliver, 2002). The advocates of social inclusion through ICTs propose a focus on electronic literacy as a key to overcoming the digital divide (Macleod, 2005). Different groups of people: students, teachers, and employers have different ideas about what computer literacy means (Johnson et al., 2006). Now, digital literacy skills are considered necessary for effective and mindful learning in the emerging digital environments (Aviram & Eshet-Alkalai, 2006). Commonly, people get their digital literacy either formally through school programs or at the workplace and/or informally, whether at home, from friends, or by themselves (Ezziane, 2007).

The implementation of ICT can also be interpreted as redesign of an infrastructure with significant impact on both the work of the individual teacher and his or her surroundings (Nyvang, 2003). In this environment and in order to perform new teaching functions, the teachers' "eTraining" should focus on the development of specific abilities and skills: 1 Professional: knowing the material, contents, activities, didactic methods and teaching plan, etc; 2 Technical: basic skills which allow them to carry out their functions appropriately, and 3 Personal: interacting, receptive capacity, giving feedback, initiative, and creativity (Blázquez & Díaz, 2006). During the last 25 years, several models and approaches of computer and information literacy have started to merge (Ezziane, 2007; Nawaz & Kundi, 2010c).

Figure 1 Nature & Issues of Technical Support for eLearning
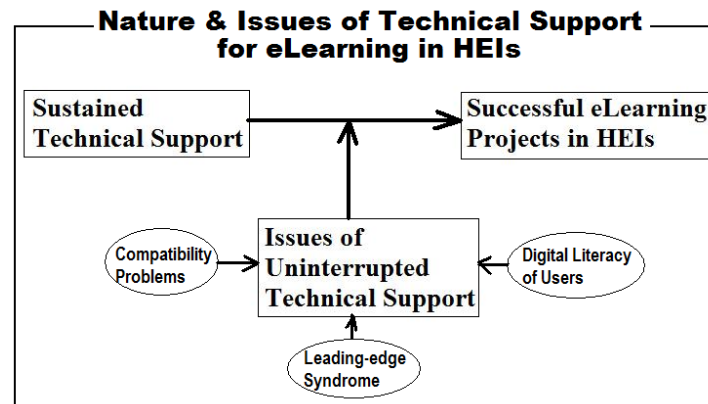
In Figure 1 'sustained technical support' is the independent variable which determines (explains) the dependent variable of 'successful eLearning projects in HEIs'. However, this relationship is interrupted by an intervening variable of 'issues of uninterrupted technical support.'

DISCUSSIONS

Without proper support and maintenance of even the most current and sophisticated hardware and software, the ability of teachers and students to access and use technology is limited (Valdez et al., 2004). The level of dependence on technical support is determined by the degree of users' digital literacy. Research shows that there is too much dependence of eLearning users on the support and services of technical help-desk and which is sometimes frustrating for the teachers and students therefore the issue has to be resolved both at the users IT department/professional and user levels. "University constituents: teachers, students & staff (Juniu, 2005)" or "campus constituents (Carey & Gleason, 2006)" have to be trained again and again to become self-sufficient in handling the digital devices.

Furthermore, although the prices of computers are falling and the developing countries are finding a variety of technologies with low budgets however, new and advanced technologies and their availability in abundance requires a lot of finances. At the same time, governments are reducing the funding of public universities therefore affording an expensive eLearning infrastructure is becoming an uphill task for the HEIs in public sector. To resolve this issue, Carey & Gleason (2006) argue that since it is not possible for the individual universities to duplicate leading edge technologies at every institute level, therefore, universities are relying on third-party solutions to meet student demands more economically. Thus, outsourcing is the collaboration with the outsiders who are specialized in a particular eLearning technology or service, for example:

1. **Applications**: HEIs have to control costs, reduce the burden on their technical staff, and improve services. Enterprise resource planning (ERP) and campus management systems (CMS) applications and more importantly, the existence of free and open source systems (FOSS), an open architecture can enable partial outsourcing of the application-base, and HEIs will easily be able to switch from one third-party service provider to another if they are dissatisfied with the services.

2. **Integration-services**: A big issue for HEIs in adopting eLearning solutions is the integration or interfaces of a multitude of software applications. This integration layer can be

outsourced to a third-party service provider. The interfaces within and outside the institutions must conform to the higher education industry standards for messaging, security and privacy.

3. **Outsourcing the processing layer**: Every HEI generally performs the same administrative functions and similar processes to support those functions. This work can be outsourced easily and cheaply to an agency that performs the same tasks for multiple institutions.

Effective technology support is concerned with planning, development, and maintenance of technology systems and resources; providing immediate support for the use of those systems on an as-needed basis; and enhancing teacher and student competency in technology integration through long-term development courses and programs (Valdez et al., 2004). So far most of the HEIs in developing countries have basic ICT infrastructure such as Local Area Network (LAN), internet, computers, video, audio, CDs and DVDs, and mobile technology facilities that form the basis for the establishment of e-learning (Sife et al., 2007). Normally it is expected that as the institute builds up its infrastructure over the years and the faculty gains experience the pedagogy followed shifts from pure lecture method to instructional technology (Mehra & Mital, 2007).

There is also great uncertainty among decision-makers and managers as well as among developers, trainers and learners: instructors find themselves confronted with a new role in which they are tutors and facilitators for learning processes (Ehlers, 2005). Technology training alone cannot necessarily ensure that these teachers would infuse technology into their routine instruction and a radical change in their instructional practices would occur. However, they need to get technical and human resource support for continuous technology integration after the training (Zhao & Bryant, 2006). Given the premise that IS development is a learning process, it requires an open environment wherein all the

participants have the opportunity to make sense of the new technological work environment (Nawaz et al., 2007; Nawaz & Kundi, 2010b).

CONCLUSIONS

The research shows that ICT professionals in universities have no knowledge of what is common practice elsewhere (Gray et al., 2003) and most of the university administrators and information technology departments provide services to the classroom in isolation from the educators (Juniu, 2005). Similarly, developers rarely report errors to the users apprehending that it may emphasize the shortcomings of their products (Buzhardt & Heitzman-Powell, 2005).The weaknesses in communication between developers and users can run into many problems like confusions, misunderstandings and conflicts leading the projects towards information system failure (Nawaz et al., 2007; Nawaz & Kundi, 2010b).

Although the digital era has bridged some of the digital divide but it has also created unequal distribution and access to technological knowledge. For example, use of sophisticated technologies brings the need to rely on IT department technological expertise support (Juniu, 2005). Researchers are identifying problems "such as user dissatisfaction with newly introduced systems, mismatches between new technologies and existing work practices, underestimating the technological complexity for employees, and inefficient end-user support (Bondarouk, 2006)." ICTs have penetrated education, but its more impact is on administrative services like admissions, registration, fee payment, purchasing rather than on pedagogy in the classroom (Dalsgaard, 2006). Thus, there needs to be a level of "eReadiness" to go for "eMaturity" of HEIs, which means the ability to utilize ICTs (Moolman & Blignaut, 2008).

Without proper support and maintenance of even the most current and sophisticated hardware and software, the ability of teachers and students to

access and use technology is severely compromised (Valdez et al., 2004). The IT division would contribute technical support and knowledge of new applications according to theories and strategies established by the pedagogues. Such a process of communication between teachers and the technical staff will help providing sustainable technical support for ePedagogy, eLeaerning and educational administration in an information society (Juniu, 2005) because learning cannot be managed rather facilitated by technologies (Dalsgaard, 2006).

Although success of eLearning in HEIs depends on the human element rather than technological sophistication (Sirkemaa, 2001) however, there is need for the existence of a supportive and responsive technical and/or teaching and learning unit, which is able to respond to the needs of individual staff (Lewis & Goodison, 2004). All the successful eLearning projects are reported to have "organizational support provided through allocation of resources and symbolic support reflected in an institution's systems, policies and processes (Lynch et al., 2005)." Furthermore, "because system start-up costs and scalability issues weigh heavily on system sustainability, we needed to design a technology-based model within the context of the existing support and resource infrastructures (Tran et al., 2005)."

Furthermore, the implementation of ICT is not just about the individual teacher but about an organization that affects and is affected by the process (Nyvang, 2003). Therefore, when designing and implementing learning software, software developers have to look beyond the paradigms of their own discipline through an interdisciplinary exchange with teachers, authors and learners (Ehlers, 2005). Similarly, research suggests that for a successful eProject of eLearning, people are the most important asset thus project managers must possess soft skills such as, communication, conflict resolution, motivation, getting along with others, and leadership (Jewels and Ford, 2006). For example, despite the

availability of the technical infrastructure, support staff, and training facilities, there is low use of technology, which suggests that there are peculiarities to the academic digital divide that need to be identified before it can be dismantled (Kopyc, 2007).

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