Impact of E-Learning on Higher Education : Development of an E-Learning Framework

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Abstract: The Internet has a tremendous technological expanding power. It has the capability to transform not only the way people accept and adopt knowledge but also to change traditional methodology and architecture of education system around the world, mainly with the method of teaching and student interaction in and with subject materials and all related relevant information. E-learning is rapidly emerging as an education tool in Pakistan just like rest of the world that uses internet technology to provide knowledge and training in Pakistani industry in general and higher education institution in particular. Using Internet as an e-Learning delivery system has created a new concept, and new initiative in the mind of business market stakeholders as well as the education institution of Pakistan, indeed e-learning has provided a platform through which university has reached out of their geographical boundaries. This has not only given them a boost of reaching out for the students but also established themselves as global education institutions in their respective fields. This paper examines the issues surrounding the impact of e-Learning on graduate student and also to develop a framework for the higher education institution within the available resources in Pakistan IT infrastructure.

Keywords: E-learning, Higher education, Stakeholder, Frame Work

1. Introduction

In most of the counties of the world education (higher) is growing positively but at the same time higher education is badly hit by increasing education cost, cut to education budget and an increasing demand for distance learning are forcing educational stakeholders to re-visit the way education is delivered to students. To cater for the shifting environment, e-learning is mainly focusing on higher education which has created a new dimension in it and has given an opportunity to educational institutions as well as to students. E-learning, or internet learning, remote learning or electronic learning, has clarified in dissimilar ways in the literature /conceptually. Commonly, e-learning generally define *"instructional content or learning experience delivered or enabled by electronic technologies"* (Lai,Ong ,Wang, 2004). Some authors have given more restricted explanation / definition for e-learning, for example, limited / restricted e-learning information's transfer through internet (Al Jones, 2003). The description used generally for e-learning, and used on broader spectrum, I will use for the purpose of my paper. Which identify the internet, intranet / extranets, video and audio recorder, CD-ROM and TV interaction, Satellite transmission, not only for course transportation, but it also provide means for communication with participating students (Canada ,Industry, 2001). Additionally some definitions has been modified recently by including wireless and mobile, wifi in e-learning application

(Suhonen, Kinshuk, Sutinen, Goh, 2003).The hierarchy of electronic learning education system of Pakistan, mostly tilted toward the conventional distance learning in most of the educational institution, the system was initially introduce to permit students from far-flung distant and rural areas of Pakistan to gain admittance to education. The concept of e-learning has encouraged significantly with the passage of time. Technological boost has been one of the main inspirations for upward trend, which was started back in 1920's by integrating radio broadcasting (Umesh, Huynh, Valachich, 2003). In recent past, the inception of intranet has given a significant boost to the innovation of different methods of delivering the educational contents (McNeil, Gunasekaran, Shaul, 2002; Teo, Gay, 2006). With the passage of time, internet is getting thicker and thicker; more people are geting in to the cyber world, computer literacy increasing, equipment and access to internet cost (Huynh et al., 2003). These changes have provided educational institutions around the world in general and in Pakistan in particular golden opening for the provision of learning content beyond their physical boundaries.

2. Literature review

E-learning has used a different technology and technique for their contents delivery to the student around the world but broadly the same concepts are being followed in this regard. The variation in the technique of e-learning offering through a number of attributes, the details of

e-learning attributes listed in table, the attributes can be further distributed in two different classes of e-learning dimensions that are Synchronicity, independence, location and different modes. Each dimension is distributed in two different attributes which match their respective dimension.

E-learning can be distributed in to two types, one is real time, and synchronous the other is flex time, asynchronous. E-learning synchronous related to the technique and technology such as electronic white board and video conferencing (Romiszowski, 2004), for which students are required to be present during content delivery. Asynchronous applications on the other hand don't require on the spot presence of the students. Instruction and tutorial can be work through the screens at student convenience time and place. Majority of the e-learning contents application is based on asynchronous model (Greenagel, 2002). Student's involvement in e-learning at the discretions of student, which are deferent location or same space and time. student can also work as a group on a given project (Gunaeesekaran et al., 2002). Distance learning courses can also be classified on the basis of level of partnership, some course need group learning like mutual discussion forums or blog or chat, the other level is totally independent, can be done individually, at the same time the delivery mode can be totally electronic (without a teacher or with) or it can be blended approach mix electronic and classroom. Blended approach is most used around the world commonly (Curt and Jack, 2001).

Table 1. **The dimensions, attributes of e-learning**

Dimensions	Attributes*	Meanings	Examples
Synchronicity	Asynchronous	Student received the course content at different time then delivery time.	Course content via e-mail
	Synchronous	Student received course content simultaneously at the time of delivery	Course content through website
Location	Same Location	Course content or application at the same physical location as that of the instructor	GSS usage to resolve a problem at the spot
	Distributed	Course content or application at the different physical location as that of the instructor/other students	GSS usage to resolve a problem at the different physical location
Independence	Individual	Individual student task to fulfill the given work	All students completed Distance learning segment in parallel
	Collaborative	Student work together with each other to fulfill knowledge tasks	Students join in blog to share their thoughts
Mode	Electronically only	Course content is delivered through e-learning applications and no face-to-face element in it	Distance powered technology Education
	Blended	e-learning blended learning, face to face	Course contents are blended with computer exercise

* Variety of sources have defined these attributes some are including (Ongs et al., 2004), (Curt and jack, 2001)

Each single course should always consist of only one/single attribute value from their respective dimension. But at the same time a particular course can be having several components, with attribute value different from each other. The example is, contents of the work can be synchronously given to the students and other asynchronously or the work may have some contents delivery from distance and other face to face in class room.

Different e-learning definition and variety of work has been done in regard to the market size and share e-education. However to estimate the market size is very difficult to determine. An estimation which believes that distance learning is one of the fastest growing sector of world education of $ 2.3 T USD. On line higher education business are predictable to be growing to $ 69 B USD by year 2015 (Hezell Associate, 2005).

For the students and institutions perspective, growth in e-education is in general and higher education e-learning in particular is obvious. Education requirement is globally on increase. Only in USA high graduate enrollment increases from 56% to 67% in 2003 (Morrison, 2003). 70% new jobs created in Canada will require post secondary education certificate (Industrial Canada, 2001). Keeping in view the cost effect of new building and limited capacity of existing class rooms at colleges, universities, distance learning is an good option (Werbachs, 2000). To remain in market, and remain competitive, higher education colleges are offering distance learning courses to race with virtual higher education colleges. (Huynhs et al.2003).

3.E-learning stakeholders'
Motivations

In the organizational perspective, stakeholder is a community of any organization (Strickland and Thompsoen, 2001). In this way, the stakeholders of any distance learning system are the affecties of it. Different stakeholders are discussed in the following paragraphs.

Students

In relation to higher education, e-learning clients are the student of graduate or under graduate enrolled at a university.

Motivations

On reaching to higher studies, most of the learners are very enthusiastic to use distance learning. It may be traditional course components for some of the students. While for other the complete course may be entirely on line. Especially for the later group of students distance learning will facilitate them and give access to higher education courses, which were not possible geographically or due to time constrain (Huynhs et al., 2003; Kaebassi and Virvous, 2004).

Instructors

One of the main stakeholder in the e-learning implementation system is instructor, traditionally instructor share and give their experience in a typical class room or face to face teaching, on the other hand, by e-learning instructor can share their teaching skill and experience to outside world with multiple students irrespective of the class room boundaries.

Motivations

There could be multiple reasons for an instructor to be motivated and take courses through e-learning system of education. For example, their institution may motivate encourage or pressurize the instructor to take on the e-learning courses. At the same time instructor may want to address multiple students.

Educational institutions

When we talk of higher education, it consists of universities and colleges. Because of popularity of e-learning the number of online universities are also increasing in addition to the traditional universities in Pakistan.

Motivations

Normally educational institutions integrate different technologies in classrooms so that lecture delivery can be facilitated. They also give distance learning, to reached large number of desirable students, e-learning can be the best solution which can offer online different courses to the large number of students, the geographical boundaries have been removed by e-learning between institutions and colleges. (Youngs, 2001).

Content providers

The online courses can be shaped by the respective teachers or it can be managed from some outside. Encouragement to distance learning sector has twisted a market potential of commercializing knowledge contents. And this is very valid for the very basic courses which are offered consistently at multiple institutions. Intellectual capital rights in e-learning will be the main concern for content providers (Huynh et al., 2003).

Motivations

The content may be provided by the instructor in any institution or by some other resource; their inspiration must be to provide such system to the students which can bring effective learning in the institutions.

The motivations for any commercial course provider could be to get maximum profit by designing such a content which can be easily adopted by any university, may be with very little changes if required.

Technology providers

For e-learning delivery, technology providers will develop the technology which will enable e-learning access beyond the institutional boundaries. This included number of services, from e-learning courses, to a complete Learning Management Systems (LMS). Continue revolution in market of hardware/software and customer constant expectations has pressurized the technology providers to offer new product quickly (Huynh et al., 2003).

Motivations

Like contents provider, technology provider will also motivate to provide an e-learning environment to the students which bring effective learning in the institutions.

Accreditation bodies

Accreditation is an important organizational body which assesses institutions offerings to judge the quality of education. And make sure that these institutions fulfill the requirements.

Motivations

With the passage of time distance learning or electronic delivery grows. It is very important for accreditation bodies to encompass e-learning in their standards. By neglecting they will limit their accreditation sense which will remain focus till traditional educations components of any educational institution (CHEA, 2002a).

4 Khan's frame work

Different names have been given to e-learning activity like flexible, distributed and open, which also include, Web-Based Training (WBT),Web-Based instruction (WBI), Internet-Based Training (IBT), and E-Learning,(anyplace, anytime, anywhere learning), are the examples. Drawing,

preparing, execution and auditing of distributed, open and flexible learning architecture require keen analysis and investigation on its use of all the contents resources of applied techniques and internet interface to develop and modify the dimensions of online distance learning environments.

Khan has developed a frame work after considering all the important factors/dimensions of e-learning environment which reflect on various factors important to e-learning contents,

In totality Khan's e-learning framework has a great potential to give a comprehensive guide line on preparing online contents organizing e-learning material and planning a complete system. Also has the capability of checking distance learning techniques.
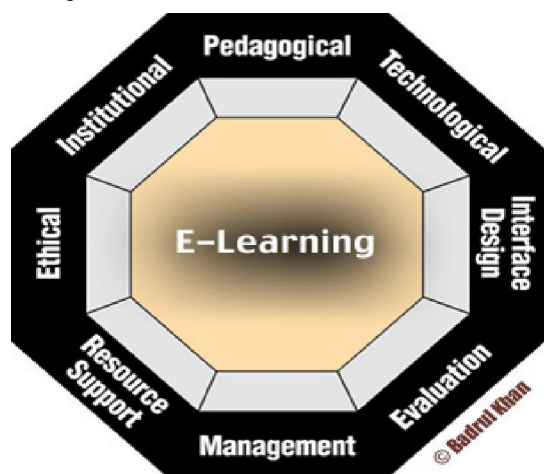

Figure 1. Badrul H. Khan E-Learning Frame Work

The hexagonal diagram of distance learning reflects teaching and learning. This hexagonal diagram of e-learning has addressed majority of the issues regarding student's scrutiny, targeting goal, medium, course and techniques, organizational issues regarding distance learning. It has also explained the technological issues on e-learning, infrastructure hardware and software planning and interface design. Distributions of information's and maintaining e-leaning environment has also explained in detail.

5. Research methodology

The research methodology of the study include two research activities consisting of semi structured interviews and questionnaires. The first stage of research consisted of the questionnaire which was asked and distributed amongst the under graduate / postgraduate and M.Phi /PhD students / faculty/ administration of different universities/colleges, the second phase conducted semi-structured interviews with the staff who were related to postgraduate courses; in the next phase semi-structured interviews taken from the sample of

e-Learning activities developers within the University. Questionnaire was distributed among 300 students. The questioners were randomly given to the students of different colleges and Universities of HEC Pakistan. Which are listed as following:-
➢ Military College of Signals
➢ College of Electrical and Mechanical Engineering
➢ Bahria University Islamabad Campus
➢ Military College Engineers
➢ UET Taxila
➢ UET Peshawar

Total of 300 questionnaires that were given to the students, only 205 were answered having a response rate of 68.3%. In the next step interview was conducted which involved the lecturers from the same colleges/universities, the next phase was to interview staff which help in the provision of e-Learning at the University.

Table **2.** Questionnaire distribution and response rate for study/Faculty/Administration.

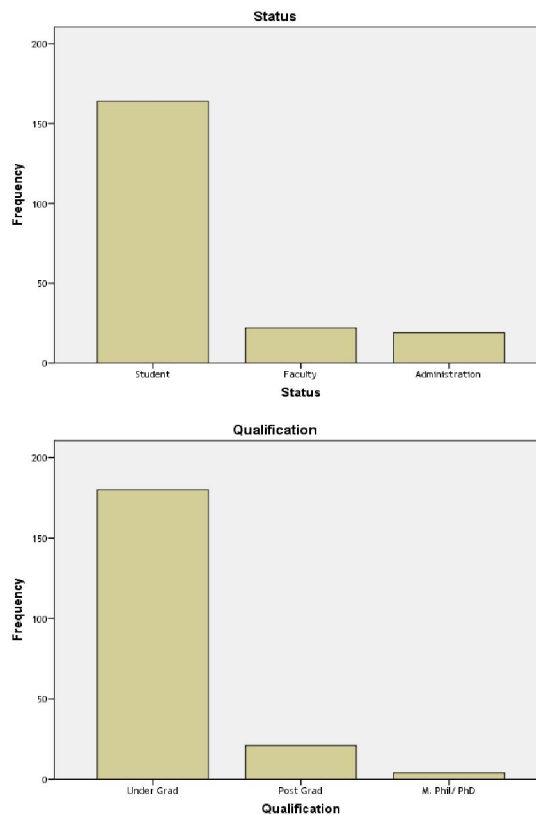| Questionnaires	Under Grad/Psot Grad/M.Phill/PhD
Total distributed	300 *study/Faculty/Administration*
Total returned	205
Response ra	68.3%

Figure **2.** Questionnaire distributions amongst study/Faculty/Administration.

6   Results and discussions
Graphical representation of results
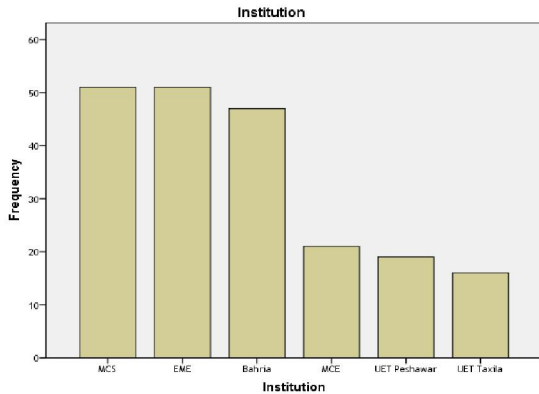
The results are illustrated in figures 3-12.

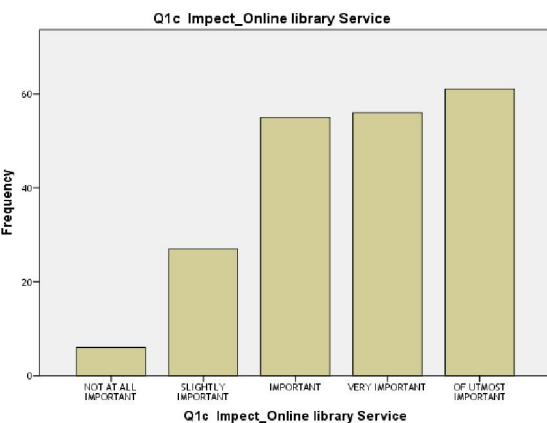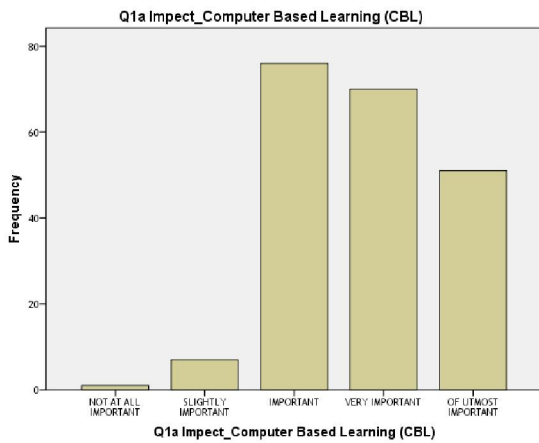**Figure 3.** Questionnaire distributions in Different universities / colleges.

Figure 4. Positive impact of Computer Based learning (CBL/Online library Service) on over all Students learning process.
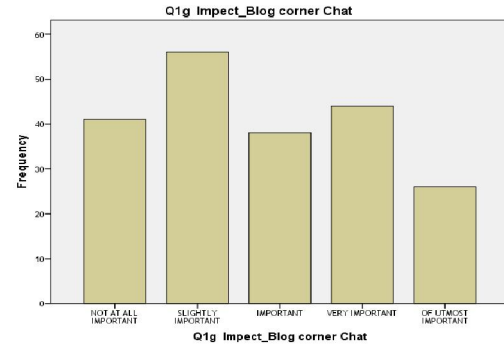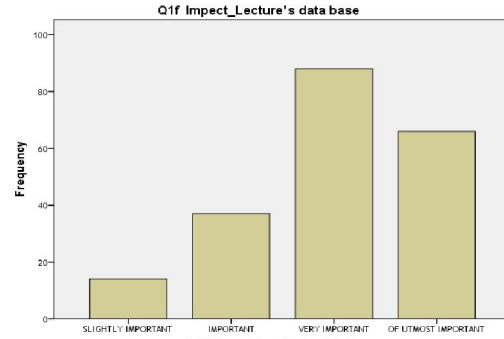

Figure 5. Impact of available Lecture's data base/Blog corner Chat on over all Students learning.

The next main question was regarding the availability of e-learning modules in different universities and colleges. The data analysis reflected as under.
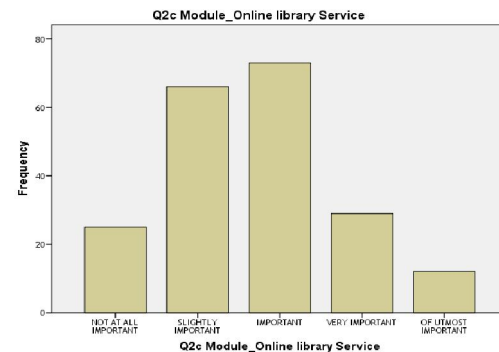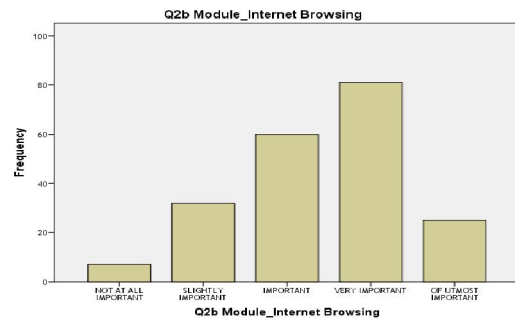

Figure 6 Availability of Internet Browsing and Online Library Service in institutions
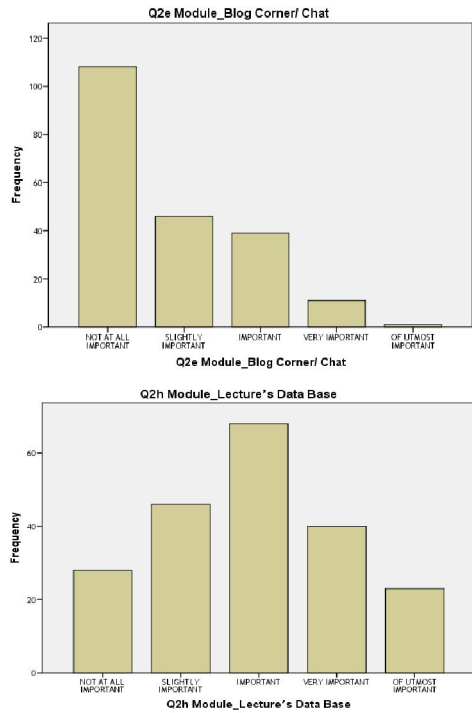
Figure 7 Availability of Blog Corner Chat and Lecture's Data Base in institutions.

Third main question was regarding the implementation factors of e-learning system in different universities and colleges. The data analysis reflected as under.
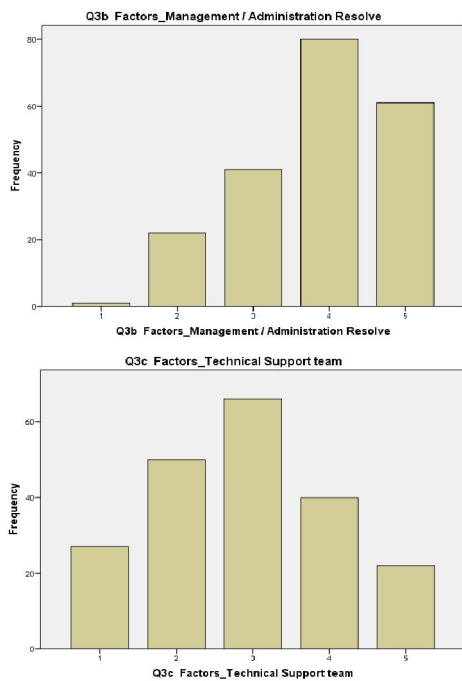
Figure 8 Importance of Management resolve and Tech support team for E-learning Implementation.

Figure 9 Importance of Student Acceptance and Instructors Willingness for E-learning Implementation.

Fourth main question was regarding the essential e-learning modules to design an e-learning web application in different universities and colleges. The data analysis reflected as under.

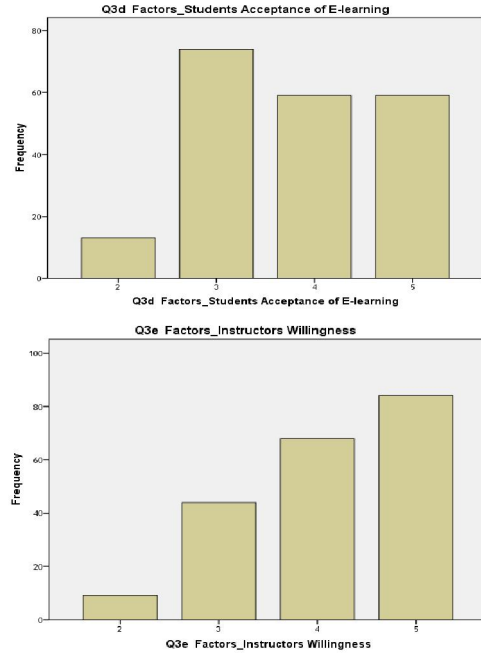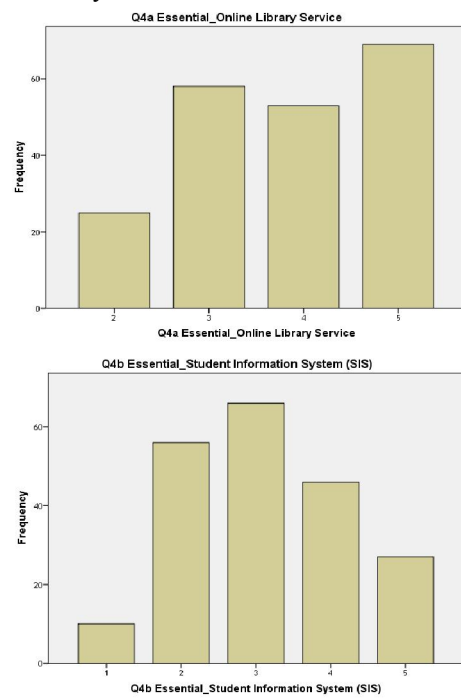**Figure 10** On line library Services and SIS are essential E-learning Modules for web application.
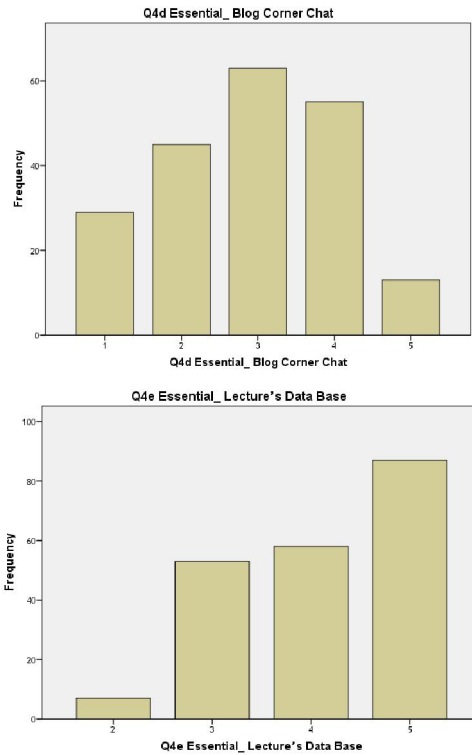
Figure 11 Blog Corner Chat and lecture's Data Base are essential E-learning Modules.
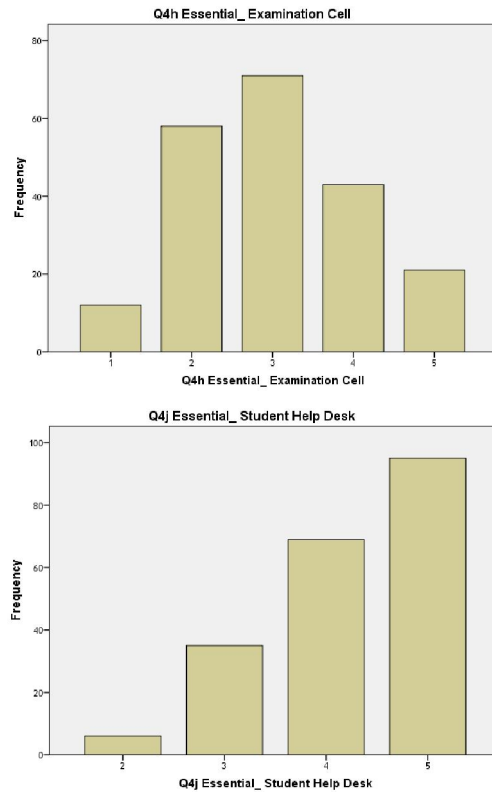

Figure 12 Web Base Training and E-mail Services are essential E-learning Modules.

Figure 13 E-Examination and help Desk are essential E-learning Modules for web application.

It can be seen that most of the 205 students i.e 68.3%, consider that there is generally lack of e-learning environment in their respective universities and colleges. Most of the students have at the opinion that availability of e-learning modules will be having good effect on their education process. 70% of the students are of the view that computer based learning (CBL) is required, 90% of the student are positive about online library, 80% have the opinion that lectures' data base including subject lectures and reference material will improve students learning. 50% student have shown their interest to have university / college Blog Corner Chat which will contribute in student learning. On the other hand available facilities are insufficient in universities and colleges from which students can get benefits. Only 15% e-learning web application is available in their respective campuses. According to survey only 10% Lecture data base is available to student, however Internet browsing are 80% available which is a positive sign, along with this 30% online library services are available to students. When student were asked to give their opinion about the important factor required for e-learning implementation, analysis says 70% is the management / administrations resolution required, 60% technical support, 62% student acceptance of e-learning and 72% instructors

willingness is required for implementations of e-learning Web applications.

At the same time student were asked to analyze the basic / essential required modules for an effective Web based e-learning applications, the date says, 80% online library service, 82% lecture data base 62% student information system (SIS). 42% college / university Blog Corner Chat, 30% college e-examinations and 52% student have the opinion that student help desk will make as effective e-learning Web base applications for any university / college to support students learning process.

7. Discussion and analysis of results

The results from this study show that generally there is a lack of e-learning facilities in Pakistani universities / colleges, which is as per the analysis affecting the students learning process. Only 30% of the overall e-learning facilities can be calculated that have been provided to students in their respective campuses. On the other hand majority of the students have the opinion that whatever facility is available that is not in a package shape but is in the form bits and pieces. It is further evident that almost none of the university / college have a complete e-learning web application. A high percentage of student have the opinion that some basic and important modules must be immediately implemented like, online library, lecture's data base e-mail services, e-examination and student help desk while interviewing the technical support team member, they have the opinion that management / administrations resolution is one of the main factor for e-learning web application implementation at the same time student acceptances of e-learning and instructor willingness is important. On the other hand administration / management have shown full resolution for implementation of e-learning modules but have shown some reservation regarding technical expertise availability and maintenance issues regarding the already installed modules in some of the universities / colleges at the same time management / administration have their opinion of misuse the modules by the students / technical staff. According to the questioners/ interviews from students, administration/ management as well as technical staff, e-learning web application must have some of the basic requirement which is very important for a good e-learning system.

There is a need to have e-mail facilities so that students can e-mail each other and so tutor may e-mail the course / group. The system must have online library so that irrespective of the distance and time student cab easily reached to the required information, along with this, Student Information System (SIS) need to be part of it, Lecture's data base

for easy retrieval of course content is also required, E-examination need to incorporate in e-learning package, university/colleges Blog Corner Chat for interaction and discussion forum, Web base e-learning training to bring acceptance for change, and last but not the least student help desk for resolving all issues and problem regarding e-learning web application and effective use. the main storage content must include lecture's data base (including subject lecture and reference material) along with e-mail, storage content services, on line library has given lots of importance during student questioner as well as interviews so a comprehensive online library service is considered to be the most powerful module for e-learning package. It appears from the interviews that only a few colleges / universities are given the online library facilities, and some of the e-learning modules, there is a strong impression in student community which feels the need for comprehensive e-learning web application to facilitate them in their learning process. Therefore I have made an effort to give a basic Frame work for the e-learning web base application which can be easily implemented in university/colleges especially in Pakistan's environment.

8 Developing an e-learning frame work for Pakistani environment

a. Badrul H. Khan e-learning frame work

The Khan framework is one of the most effective and comprehensive theoretical e-learning model. E-learning can be defined now as Badrul H. Khan stated: ''An innovative approach for delivering well designed, learner-centered, interactive, and facilitated learning environment to anyone, anyplace, anytime, by utilizing the attributes and resources of various digital technologies along with other forms of learning materials suited for open and distributed learning environment'' Khan has divided his framework in three segments, the first segment is related to education, which consist of Pedagogical, Evolution and Ethical. The other segment is related to technology and interface, the last 3rd portion is related to managerial issues, which includes management of resource and different elements of institutions resource support and management.

b. Modified frame work for Pakistani environment

I have made an effort to modify Khan Framework which can best suite Pakistani environment, there for i called this framework as reinforce framework for Pakistan. This based on all the important dimensions having some additional segments which are best suited for Pakistani environment.

Pakistani Hei Frame Work

ETHICAL

1-Social & Political Influence
2-Bias
3-Political Issues
4-Geo/Cultural/ Learning Diversity
5-Etiquette
6-Legal Issues
7-Info Accessibility
8-Religious Diversity

EVALUATION
1-**Evaluation of Content Development Process**
2-**Evaluation of E-Learning Environment**
3-Evaluation of E-Learning a the program & Institutional Level
4-Assessment of Learners

INSTITUTIONAL
1-Administrative Affairs
2-Academic Affairs
3-Student Services
4- Accreditation

INTERFACE DESIGN
1- Page and Site Design
2-Contents Design
3-Navigations
4-Accessibiltiy
5-Usability Testing

MANAGEMENT

1- Process, People and Product Field
2- Team for Management
3-Managing Development e-Learning Content
4- Environment for Managing e-Learning
5-Resources
6-Online VCLE
7-Physical Security

PEDAGOGICAL

1-Content Analysis
2-Audience Analysis
3-Goal Analysis
4-Design Approach
5-Instructional Strategies
6-Organization
7-Blending Strategies

EDUCATIONAL DOMAIN

ORGANIZATIONAL DOMAIN

TECHNOLOGICAL DOMAIN

EVALUATION
ETHICA
INSTITUTIONAL
INTERFACE
MANAGEMENT
LEARNER
TECHNOLOGY HR CAPACITY
TECHNOLOGIC
PEDAGOGICA

TECHNOLOGICAL HR CAPACITY BUILDING
1-Academic staff
2-Instructors and IT staff

TECHNOLOGICAL
1-Infrastructure Planning& Wireless
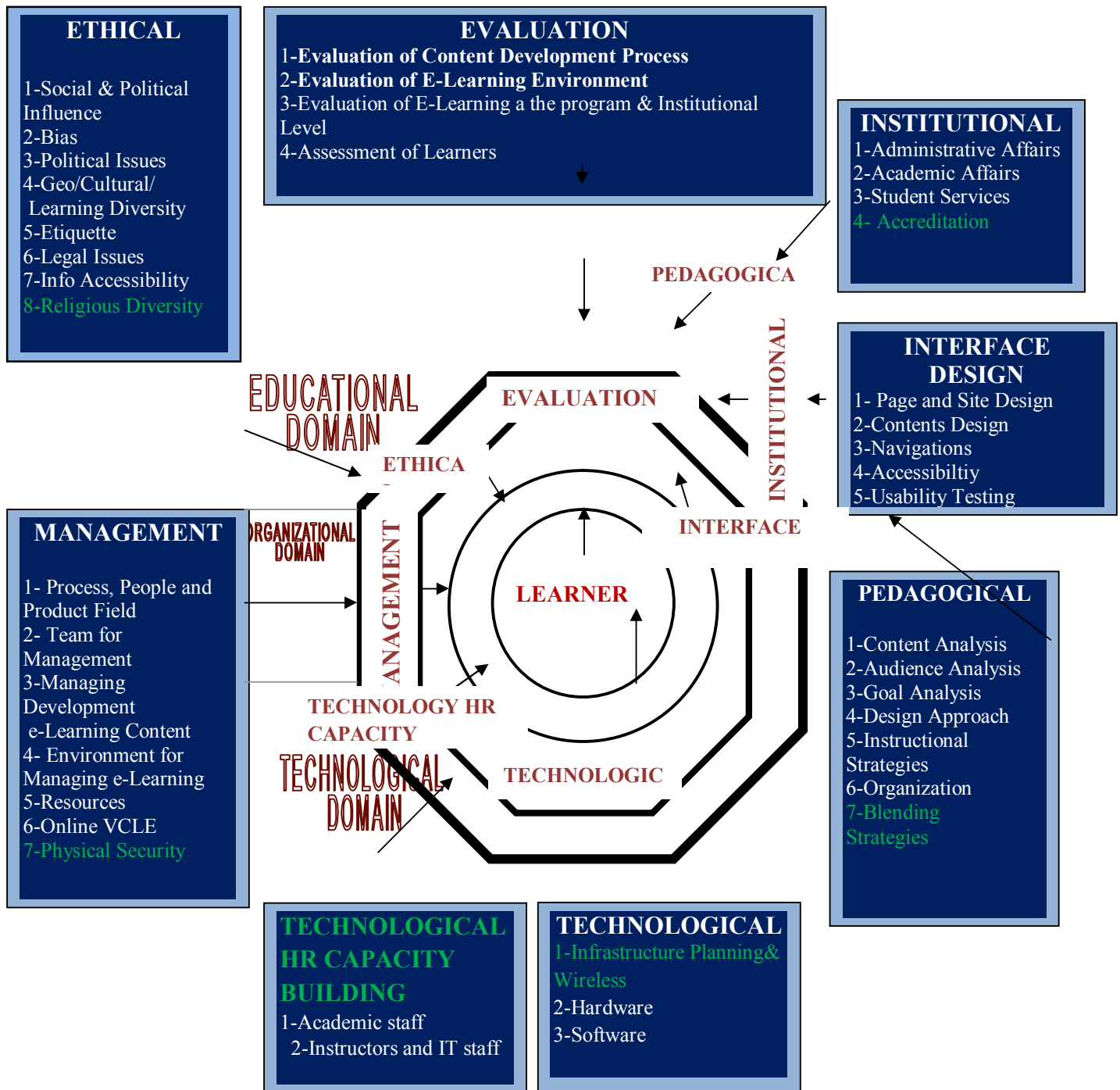2-Hardware
3-Software

Figure 14 Pakistani Higher Education Institution Frame Work

These differences are incorporated after deep analysis and concentrated efforts on e-learning process, and student demand in Pakistan. My deliberations have resulted in the following considerations:

1. I rearrange segment location by moving Technology dimension at the bottom, which means that the e-learning frame work is based on technology instead of management. Which support the entire e-learning activities and act as a pivotal role for the entire frame work..

2. Technological dimension is only explaining infrastructure planning, hardware and software, which i have expended to new upcoming technologies like Wireless technology and many more. This will directly affect the cost factor.

3. Content security is part of my modified frame work under the technology dimension to cater for any misadventure or disaster.

4. Institutions parameters are mainly focused on administration affairs, student affairs and services related to academics related to e-learning, which I think is missing a very important factor of accreditation, which I cater for modified frame work.

5. Human resources capacity building is also added which is not touched in Khan's frame work, for supporting hardware and software, human resources building up along with training of instructors / trainees is very important which has been catered in the modified framework.

Conclusion

E-learning applications are the requirement of the day; Timely response to the requirement will act as a launching pad for the Pakistani HEI learning capacity, and will give an opportunity to their student to stand parallel to the world demand. Majority of the colleges / universities have accepted Khan's framework into their system by modifying some of the parameters while implementing the main eight segments of the Khan's octagon. The main idea has implemented in one and other shapes and names. In this particular analysis I targeted on the Pakistani HEI environment in particular and almost all the effecting factors in the colleges/ universities education system, which are, shifting / changes in technologies, wireless, Wi-Fi boom and very critical human resources in the system. In my frame work learner and content are given much importance and learner centeredness concept has given by providing different resources, and contents availability in a digital environment. On the other hand learning environment and education system will continue to modify and purify, at the same time new frameworks and new models of education system will continue to changes and adjust to particular learning system, The given modified frame work is best suitable   model

9/04/2012

for Pakistani HEI, and will act as a bass line for new e-leaning education environment in Pakistan.

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