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Literature Review

Identification and prioritization of critical issues for the promotion of e-learning in Pakistan

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ABSTRACT

Integration of information and communication technology in education is emerging as the new paradigm of learning and training. Higher education institutions are struggling to shift to this new paradigm to facilitate more and more learners with the flexibility of any time-anywhere learning. E-learning is not gaining as much popularity in the developing countries as it was expected in the last decade. Little work has been done in this area of research in the developing countries. This study contributes to identify and analyze the impact of critical issues which are creating barriers in the promotion of e-learning in the developing countries like Pakistan. Furthermore, this study contributes in devising taxonomy and proposing new category software for the identified critical issues. A mix mode research model has been applied to collect data from the e-learning experts of different public sector universities of Pakistan to get a deeper understanding of the issues and their impact on the promotion of e-learning in Pakistan. The findings of this study reveal sixteen (16) critical issues which are classified in five (5) dimensions, to be addressed on priority basis to promote e-learning in Pakistan. The identified dimensions and issues have been prioritized according to their importance using the Analytical Hierarchy Process method.

Contents

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1. Introduction

The integration of Information and Communication Technology (ICT) in the field of education can be easily recognized in the existing literature (Abdellatief, Sultan, Jabar, & Abdullah, 2011; Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012; Collis & Moonen, 2012; Gerbic, 2004; Sajja, 2008). It reshapes the traditional distance education into the new electronic mode of education. Numerous synonyms can be found in literature for this new paradigm, e.g. internet based learning (French, 1999; Gerbic, 2004), borderless learning (Latchem, 2005), flexible learning, online learning, technology based learning, web-based learning, electronic learning or sometimes also called e-learning (Forman, Nyatanga, & Rich, 2002; Khan, 2003; Puri, 2012; Sajja, 2008; Selim, 2007). We will use the synonym "e-learning" to refer to the ICT based education for this study. E-learning is a rapidly progressing method of education and training round the globe due to its ease of accessibility, learning, training and cost effectiveness. This mode of learning can also be used to improve the quality of teaching and learning (Bhuasiri et al., 2012). E-learning market has a growth rate of 35.6% worldwide (Sun, Tsai, Finger, Chen, & Yeh, 2008). Due to this reason universities all over the world are switching to this borderless learning to reduce the cost of education and to enhance their revenue.

It is still difficult to find a single complete and comprehensive definition of e-learning from the existing literature. E-learning is considered the learning using electronic devices which deliver the contents to the learners. The devices include internet, audio, video, TV, CDROM, satellite and so on (Abdellatief et al., 2011; Ozkan & Koseler, 2009). Another definition of e-learning is the learning and communication activities using computers and network (Roffe, 2002; Schank, 2002; Wong, 2007). Furthermore e-learning can also be defined as a learning platform based on internet, which is facilitating both the learners and the instructors to cooperate with each other to enhance learning (Lau, Yen, Li, & Wah, 2013). In addition, e-learning is further explained as self-directed learning based on web technologies. He emphasized that e-learning is actually collaborative learning (Bleimann, 2004). It is also urged by Sun et al. (2008) that e-learning is the use of telecommunication technology to deliver information for education and training. In brief, it can be concluded from the above definitions that e-learning is based on ICT (Arif et al., 2014).

In Pakistan, higher education facilities are progressively expanding for uplifting the socio-economic condition of the people. The Higher Education Commission (HEC) of Pakistan supervises all the universities and degree awarding institutions in the country to evaluate, improve and promote higher education and research in the country. HEC categorized higher education institutions (HEIs) into three groups; (1) public sector universities, (2) private sector universities, and (3) degree awarding institutes focused in some specialized disciplines. At present, there are total of 139 universities/degree awarding institutions in the country (Finance, 2014). However, the demand of higher education is running ahead of available resources at formal universities and degree awarding institutions (Khattak, 2010).

The education system of Pakistan faces numerous problems at all level especially at the higher education level. These problems include acute shortage of qualified faculty, low student motivation, outdated curriculum, inequality of opportunities between urban and rural areas, across gender and amongst provinces of the country (Aziz et al., 2014). Moreover, education sector has always been given lower priority in terms of government and social expenditures. Public expenditure on education is less than 2% of the GDP (Rahman, 2014). The adult literacy rate is 76% in urban and 51% in rural areas with the population of estimated 170 million (Finance, 2014). This situation of lower literacy rate in the rural areas of the country is due to the lack of educational facilities, quality teachers and unawareness of the importance of education for the economic betterment of the people. Furthermore, access to higher education is one of the most acute and continual challenge to build up the human capital and transforming into knowledge based economy. The likelihood of investment in the development of infrastructures to support HEIs to shift from traditional education system to new paradigm of e-learning seems to be challenging due to little spending of the government in the education sector (Qureshi, Ilyas, Yasmin, & Whitty, 2012). It is the need of the hour to integrate ICT in the higher education system and a paradigm shift is required from the conventional educational system to the new computer mediated education model for the promotion of higher education in Pakistan. This gap is being filled by distance education or e-learning to educate the masses nation-wide.

E-learning is still in its early stages of adoption and implementation in the developing countries. They are facing different challenges in the implementation which are quite different from the developed countries (Bhuasiri et al., 2012; Nawaz, 2012). Many developing countries including Pakistan are eager to implement the e-learning paradigm (Grönlund & Islam, 2010) but are experiencing different issues such as resources, infrastructure, internet access, support from institution, personal characteristics as well as culture and policy in the promotion of e-learning paradigm (Bhuasiri et al., 2012; Nawaz, 2012). Economic and law and order situations are at the downward trend in Pakistan. In this current scenario, e-learning is the best possible solution to educate and train the people. E-learning is not gaining as much attention in Pakistan as it was expected (Khan, 2007). We have found that little work has been done in this area of research in Pakistan. Some studies have been conducted for Pakistan such as (Farid, Ahmad, Niaz, Itmazi, & Asghar, 2014; Iqbal & Ahmed, 2010; Kundi, Nawaz, & Khan, 2010; Nawaz, 2012; Qureshi et al., 2012; Qureshi, Nawaz, & Khan, 2011), but these studies have identified only some of the e-learning challenges, issues or predictors but no classification of the issues have been performed. Moreover, according to our knowledge, no such study have been conducted which have not only identified but also classified and prioritized the issues for the promotion of e-learning in Pakistan.

Our study attempts to identify, evaluate, classify and prioritize the challenges and issues according to their importance and relevance in a particular dimension for the promotion of e-learning in higher education of Pakistan. So that HEIs and HEC of Pakistan may revise their strategies, plans and policies for the promotion of e-learning in the higher education. We have also developed the taxonomy of the identified issues within our derived five dimensions. Moreover this study also contributes by prioritizing the identified issues by applying the technique of Analytical Hierarchy Process (AHP), which has never been done before for the e-learning issues. Furthermore, opinions of e-learning experts, faculty members and administrators may lead our effort to the point which may be helpful for the HEIs and HEC of Pakistan in promoting e-learning, achieving the higher literacy rate and "education for all" in the country.

This paper is organized as follows. Section 2 discusses the background of the e-learning in the context of Pakistan. Section 3 describes our research methodology. Identified critical issues and their impact on the successful adoption and promotion of e-learning in Pakistan are discussed in Section 4. Prioritization of the identified issues using AHP is elaborated in Section 5. In Section 6 we discuss the proposed taxonomy of the critical issues. Finally, in Section 7 we conclude and discuss the future directions.

2. Background

The intense use of the ICT in the education sector of the developed countries alleviates to the establishment of completely ICT-based universities called virtual universities. Moreover numerous world leading universities are also offering courses through the use of ICT to the distant learners, so that to become "dual mode universities" (Islam & Selim, 2006). Nevertheless, in the education sector, developing countries are facing problems like lack of skilled teachers, educational infrastructure, and technology access to enhance the education at different levels (Nawaz, 2012; Qureshi et al., 2012). According to the policy statements of the international agencies like UNESCO, World Bank, European Commission etc. that open and distance learning is gaining popularity since 1990 (Perraton, 2007). It is observed that lack of resources including furniture, buildings, qualified teachers and learning material are the main obstacles in promoting open and distance learning (Gulati, 2008). In the developing countries like Pakistan, ICT has not penetrated to higher magnitude in many HEIs due to the various socio-economic and technological considerations (Sife, Lwoga, & Sanga, 2007).

Many countries are integrating ICT in education to enhance the learner's experience of learning (Pagram & Pagram, 2006). This drift can easily be perceived in Pakistan also as after year 2000 there is rapid growth of ICT infrastructure in Pakistan. The Government of Pakistan (GOP) is keen in establishing IT infrastructure and to enhance this digital learning in the country. For this purpose, a university named Virtual University (VU) of Pakistan and National ICT R&D Fund for the lifelong learning was also established 10 years later. Furthermore socio-economic, cultural and technological limitations are also acting as obstacles in achieving the higher literacy rate in the country (A. Khan, 2007). Pakistan has an existing "ICT in Education Master Plan" which was developed in 2007. This plan defined the strategies to integrate ICT for the expansion of educational opportunities, improvement of the student learning and to develop the capacity at various levels of education (HEC, 2013). But GOP is still trying to achieve the target i.e. "education for all". So for that, it is required to identify the critical issues of e-learning so that the goal of the GOP may be achieved. Moreover, the classification and prioritization of the critical issues is also required so that a paradigm shift from the conventional educational system to this new ICT mediated education model becomes possible.

Allama Iqbal Open University (AIOU) Islamabad is one of the mega universities of the world for providing education through distance learning paradigm. It is the first distance learning university of Pakistan which was established in early 1974. With the explosion of ICT, AIOU is also changing its mode of learning toward e-learning to facilitate learners as much as it can. A center for instructional designed has been established in AIOU, so that to develop localized Learning Objects (LOs) to facilitate the local students at their places through e-learning. LO can be defined as an entity in an electronic form. It may be a text, an audio, a video, a power point presentation or online courses etc. which may also be recognized as an e-learning product or a pedagogical entity (Berger & Rockmann, 2006; Khattak, 2010). It can be further explained as a resource that can be reusable and digital with the aim of achieving the learning objectives is known as a LO (Güler & Altun, 2010). Another term that can be used to represent LO is known as multimedia information, which is the collective set of contents including text, animation, audio, video or image (Lau et al., 2013).

HEIs of Pakistan other than AIOU are also trying to adopt this learning method following the footsteps of the AIOU. These HEIs are facing numerous problems in integrating ICT in their traditional education system. Major challenges encountered in this regard are economic, social, cultural, political, high cost in establishing new labs for science related subjects, shortage of skilled personnel and deficiency of funds to establish new educational institutions in the remote areas. In order to highlight and grapple with these problems, few authors have come up with their studies to identify the e-learning issues facing by the HEIs of Pakistan. Some e-learning issues including technological and institutional infrastructure, computer literacy, English competency, lack of awareness, teacher training and interaction between the student and the teacher have been identified as the crucial challenges for the promotion of e-learning (Siddiqui, 2007). Another effort has been made by Iqbal and Ahmed (2010), but only some issues like training to the teachers, steady supply of electric power, ICT infrastructure, student's assessment and sufficient funding by the GOP have been identified by focusing only on one public sector university and no further discussion have been carried out done in their study. Another effort has been made by Qureshi et al. (2012). The authors have identified technical difficulties, computer literacy, computer access, security and privacy, face to face interaction, English competency and students' resistance to change as some of the challenges for the implementation of e-learning in Pakistan. Their study emphasized and limited to only one private sector university rather than considering the other HEIs of Pakistan. Moreover, the authors have emphasized on the implementation level rather than promotion of the e-learning. Another effort has been made by Kundi et al. (2010), highlighting the predictors of success for the e-learning. The authors discovered lack of user training, underestimation, lack of awareness, lack of technical and administrative end-user support and resistance to change as some of the users' problems in e-learning. The main focus of their study is only the user satisfaction. Moreover, their study is limited to only one province of Pakistan i.e. NWFP (now called Khyber Pakhtunkhwa (KPK)). Some e-learning issues related to developing countries like Pakistan has been identified by Nawaz (2012), by exploring the experiences of the HEIs of advanced states, developing countries and Pakistan. Lack of user perception, ineffective user training, borrowed e-learning models, digital divide and lack of technical support are some of the issues identified in this study. Some e-learning challenges like lack of knowledge about technology, usage problems and accessibility to e-learning tools

have been reported by Farid et al. (2014) on the basis of a survey carried out in the public sector universities of Pakistan.

However, state-of-the-art studies, in the context of Pakistan, are limited only to highlight different challenges, issues or predictors of the e-learning. Furthermore, these studies have neither attempted to classify the identified issues into respective categories nor performed the prioritization of the issues. Therefore, we have performed the classification and prioritization of the issues in this study, which consequently guide the HEIs, HEC and ICT R&D Fund of Pakistan to revise and improve their strategies to achieve the target of "education for all" and to expedite the process of the paradigm shift. In order to achieve our objectives, we have derived the following research questions in the context of HEIs of Pakistan;

RQ1: What are the state-of-the-art critical issues of e-learning?
RQ2: How these issues impact on the promotion of e-learning?
RQ3: What are the possible categorizations of the identified issues?
RQ4: Which issues are most important and needs priority for the promotion of e-learning?

3. Research design

3.1. Sample

The first step in the research design is to select the sample. The sample selected for this study consists of experts having at least five (5) years of experience in three (3) major fields of e-learning namely academia, software development and administration. Utmost care has been taken in selecting these experts. The experts from academia and e-learning administration have been selected from different public sector universities of Pakistan which have adopted e-learning as one of the mode of education. The software development experts have been selected from the software industry of Pakistan having experience in developing various e-learning applications. Major stakeholders of this study are depicted in Fig. 1.

The sample size for this study (as illustrated in Table 1) consists of twenty (20) experts. Among these, eight (8) belongs to academia and actively involved in the e-learning research. Six (6) are from the software development industry and four (4) experts are from e-learning administration. Beside these, two (2) experts have experience of working as administrators of instructional design as well as researchers in the field of e-learning. It is pertinent to highlight that the all of these sampled e-learning experts are holding senior positions in their organizations and are playing key role in the existing e-learning environment of their institutions.

3.2. Data gathering

Data gathering is the most important and common activity in conducting the research. It is a difficult as well as a complex task. Numerous methods can be used to collect the data such as face to face interviews, telephone interviews, data sampling, surveys, written material, documentations, questionnaires and observations (Kajornboon, 2005). The method of interviews is adopted for the purpose of finding the facts regarding this study. Interviews are a systematic way of finding the facts from the people by conversations. There are many reasons for conducting interviews as a data gathering tool, some of these are summarized here:

1. It provides an opportunity to probe in the depth of the topic (Bailey, 2008).
2. It is possible for the researcher to attain highly personalized data from the respondent (Gray, 2004).
3. Maximum return rate as compared to questionnaires is possible to achieve (Austin, 1981).
4. Researcher can validate the response of the respondent by observing non-verbal behavior (Gorden, 1975).
5. Researcher can easily monitor that all respondents have answered all the questions (Bailey, 2008).
6. It is an easy way for those respondents who are not well-educated and feeling difficult to write the answer in their native language (Bailey, 2008; Gray, 2004).

The variations in the fields of our sampled experts prevent us to follow the approach of structured interviews with all the stakeholders. So for our study we have adopted the approach of semi-structured interviews with the selected panel of experts. The interviews have been conducted from January 2014 to March 2014. In order to identify the critical issues of e-learning, we have examined the experiences, observations and opinions of the

Table 1
Expert panel demographic profile.

Demographic	Frequency	Percent
Gender:		
Male	14	70
Female	6	30
Age:		
(a) 21–30	1	5
(b) 31–40	3	15
(c) 41–50	10	50
(d) 51–60	4	20
(e) Over 60	2	10
Qualification:		
(a) Bachelors	3	15
(b) Masters	4	20
(c) Doctorate	13	65
Area:		
(a) Academia & Research	8	40
(b) Administration	4	20
(c) Software Development	6	30
(d) Both a & b	2	10
Average Experience	7 years	

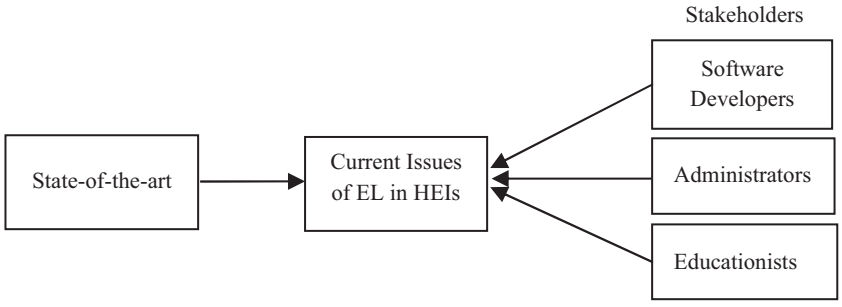

Fig. 1. Sources of data collection.

researchers from the existing literature. More than fifty (50) published research papers, articles, case studies from various well renowned journals and conferences are studied. We then performed an exploratory study to find the critical issues that are playing positive and/or negative role in the promotion of the e-learning. Based on the literature review, an interview plan has been formulated to be used for the semi-structured interviews. This plan has been checked and validated by two e-learning experts to assure its relevancy and clarity.

3.3. Data analysis

In order to find out the answers to the RQ1 and RQ2, our objective is to identify the current issues which are acting as obstacles in the promotion of e-learning in Pakistan. These identified issues are discussed in detail in Section 4. Moreover, we also intend to categorize the identified issues into respective dimensions. We have adopted the process similar to (Niazi, Wilson, & Zowghi, 2005) for the identification and categorization of themes.

We have analyzed the gathered data by applying the method of content analysis. It is a procedure used for the categorization of verbal or behavioral data for the purpose of classification, summarization and tabulation (Mathers, Fox, & Hunn, 1998). All the interviews of the panel of experts have been recorded and transcribed. After critically reviewing the interview transcripts, a list of themes (i.e. e-learning issues here) was populated from the text. We list down these themes and then compared them with the notes which were generated during the interviews. This activity assures that the transcripts are the true reflection of the discussions and interviews with the e-learning experts (Niazi et al., 2005). All the interview transcripts were reviewed critically again to generate the major dimensions as shown in Table 2. Different themes were grouped together in different dimensions by observing their relationship with other themes in the same dimensions.

We have also devised taxonomy in order to find out the answer to our third research question RQ3. This taxonomy contains five dimensions of e-learning based on our data analysis process. These identified dimensions include Software, Personal, Technical, Institutional and Cultural. Except for the Software dimension, the rest of the four dimensions have already been identified in the literature by various researchers in different contexts as discussed in Section 1. The detail of the taxonomy is given in Section 5. The identified issues are then ranked with respect to the importance and imperative for the localized environment of HEIs of Pakistan so that the answer of our research question RQ4 can be achieved. For this purpose, AHP method has been deployed on the survey responses conducted from the e-learning experts in Pakistan. Local and global ranks along with the respective weights of the identified issues are discussed in Section 6 and are illustrated in Table 8 and Table 9 respectively.

4. Identified issues and their impact

Most of the HEIs of the Pakistan have started distance learning programs in various disciplines. Their goal is to adopt this computer mediated learning environment to facilitate learners at their own places. There are numerous hindrances in achieving their goals and objectives. After critical analysis of the reviewed literature and the transcripts of interviews of the e-learning experts, we have identified sixteen (16) critical issues, which have an impact on the adoption and promotion of e-learning in Pakistan. The identified issues (both from literature and experts) are

Table 2
Quotes supporting the interpretation of five dimensions.

Dimensions	Supporting quotes	Interpretation
Software	"Difficult to understand the concept of quality itself" "There are ambiguities in development process of e-products" "Instructional Design process is based on ADDIE, which needs to be modified w.r.t localized requirements". "There is shortage of skilled software designers to design the e-products according to the user requirements".	These examples support the interpretation of the theme "software" because participants are emphising on the need and implementation of software engineering practices in developing and assuring the quality learning objects
Technical	"It is difficult in load multi-media enriched web sites with the existing available bandwidth especially on dial up connection and DSL as well" "In remote areas bandwidth is too less as compared to the urban areas" "Continuous connectivity to the internet broadband becomes dream in peak hours" "Mobile services providers charging very high cost for using internet services on PDAs, androids etc." "In some of the provinces, it is difficult to get the signal strength of mobiles as well" "It is hard to participate in the lecture or chat session due to uncertainity in the electric supply"	These quotes support the interpretation of the theme "technical", because the reported problems are based on the availability of the technical facilities
Institution	"HEIs are facing problems due to shortage of funding" "Development of ICT infrastructure is only possible when sufficient funding will be provided by HEC" "HEIs do not have resources/funding to create learning resources in their instructional design departments" "It is difficult to manage practical arrangements for the courses which require mandatory practical for learning"	These quotes support the reported problems faced by institutions in implementing e-learning successfully. These examples interpret the theme "institution", because these quotes are related to the institutions
Personal	"Faculty members at HEIs are not interested to adopt the e-learning as new paradigm" "There is lack of ICT skills in students, so that they avoid registering in e-learning mode courses" "Teachers are also having insufficient knowledge regarding ICT"	These examples support the interpretation of theme "personal", because the problems reported by the respondents are belong to the personal skills of the learners and teachers
Cultural	"Learning material is in English language: "We need the learning material in the local language" "People do not want their daughters to move towards the HEIs"	These examples support the interpretation of theme "cultural", because reported problems are related to the social and cultural norms of the people of the Pakistan

illustrated in Table 3, some issues (1–8) are common among developed and developing countries like Pakistan and can easily be recognized by the literature, however, there are some issues (9–13) are unique and have been addressed by those studies which are specifically conducted in the context of the HEIs of Pakistan, whereas, rest of the issues (14–16) have been identified in this study by conducting interviews from our sampled e-learning experts.

Identified issues and their impact provide the answers to our first two research questions, i.e. RQ1 and RQ2. We will now discuss each of the identified issue with reference to RQ1 and RQ2.

4.1. Localized LOs in local language

RQ1: The concept of LO is relatively new for the educationists especially from the developing countries like Pakistan. The term LO has been coined in the field of computing and is not native to the educationists (Ip, Morrison, & Currie, 2001). HEIs of the developed countries are developing these LOs for the last three decades. Later on these LOs are then adopted by the developing countries like Pakistan, but it is not easy for the HEIs of Pakistan to adopt LOs due to the shortage of ICT experts, poor accessibility to the ICT infrastructure, high development cost of LOs and the gap between the teaching and the learning communities (Khattak, 2010).

RQ2: The HEIs of Pakistan need to develop the LOs in their local environment in accordance to the localized needs and existing ICT infrastructure. This will have a positive impact on the implementation and promotion of e-learning.

4.2. Lack of instructional design process

RQ1: For the development of software, various process models have been proposed e.g. System Development Life Cycle (SDLC), Rational Unified Process (RUP), Incremental, Spiral, Agile methods etc. These process models can be applied in different scenarios depending upon the software requirements, development time and budgetary constraints. Unfortunately there is no specific process model defined which covers the instructional design process or the development process of LOs in localized environment.

RQ2: There is a dire need of a unified LOs development process on which both the software engineer and the educationist should agree. This issue had also been highlighted by Barbosa and Maldonado (2006) that there exist a need of systematic procedures to develop the quality educational products. As there is no process model proposed for the development of LOs so this is also creating hindrances in the successful implementation of e-learning in Pakistan.

Table 3
Identified e-learning issues in Pakistani context.

No.	Critical Issues	Literature
1.	Lack of instructional designer	Ivergård and Hunt (2005)
2.	Lack of instructional design process	Barbosa and Maldonado (2006)
3.	Lack of software quality assurance process	Chua and Dyson (2004), Babu (2005)
4.	Bandwidth	Homan and Macpherson (2005)
5.	Lack of formal implementation process	Qureshi et al. (2011), Masoumi and Lindström (2012)
6.	Lack of interest of Faculty	Forman et al. (2002), Qureshi et al. (2011)
7.	Lack ICT enabled teachers	Carr (1999), Levy (2003), Iqbal and Ahmed (2010), Põldoja et al. (2012), Nawaz and Khan (2012)
8.	Lack ICT enabled students	Oliver (2001), Qureshi et al. (2011, 2012)
9.	Power failure	Sangi (2008), Iqbal and Ahmed (2010)
10.	Lack of LOs in local language	Khattak (2010)
11.	Socio-cultural norms	Iqbal and Ahmed (2010)
12.	Lack of resources	Iqbal and Ahmed (2010)
13.	Accessibility of Internet broadband	Farid et al. (2014)
14.	Cost of mobile internet	Expert opinion
15.	Practical arrangements for practical oriented courses	Expert opinion
16.	Literacy rate	Expert opinion

4.3. Lack of instructional designers

RQ1: The design of a product has a profound effect on the quality of the product. Poor design may lead to a low quality product. The main role of the instructional designer is to design the course contents in a manner which should fulfill the course learning outcomes and also should enhance the learning of the learner. According to (Ivergård & Hunt, 2005) effective designing of the e-learning course is a challenge for the learners and the e-learning providers.

RQ2: Adequate resource person are providing their services to AIOU, VU and other HEIs of Pakistan in the field of instructional design. But they do not have the proper expertise and skills in designing the courses in electronic format (Iqbal & Ahmed, 2010). This leads to poor designing of the LOs which hamper the effective learning of the learners.

4.4. Lack of software quality assurance process

RQ1: The precise measurement of quality is a challenge. The software developers and academicians are part of the team to measure the quality of the e-learning system. A lot of efforts have been expended in developing software engineering standards by the experienced software engineers and academicians (Tuohey, 2002). But there is still no agreement on the standard model for the evaluation and assessment of quality of the e-learning systems (Chua & Dyson, 2004). Formal frameworks do not exist for evaluating the quality of the e-learning system and the contents of the e-learning products. It is urged by Babu (2005) that developing a quality assurance framework is the need of the hour as e-learning managers need an assurance of the quality of tools such as Learning Management System (LMS) and Content Management System (CMS). These tools enable organizations not only to administer their educational resources but also to support their traditional education and distance education (Al-Busaidi & Al-Shihi, 2012).

RQ2: A quality model or a framework is required that helps the developers and the educators of the HEIs of Pakistan in assuring and assessing the quality of their e-learning systems. The absence of a quality model results in the poor quality of the e-learning systems, which is creating hindrance in the successful adoption and implementation of the e-learning systems in Pakistan.

4.5. Bandwidth

RQ1: Implementation of successful e-learning environment is a dream without sufficient bandwidth. The HEC of Pakistan has facilitated the HEIs of Pakistan with the high speed internet but students from both the urban and the rural areas are suffering with the problem of low internet speed outside the campuses. Slow speed of internet, busy internet lines, load of traffic on international highway in the peak hours are effecting e-learning (Akar, Öztürk, Tunc, & Wiethoff, 2004; Hiltz, 1997; Rourke & Anderson, 2002; Wong, 2007). If some students log on to access the course from their institution over the slow speed internet and unreliable

networks, it will take longer time for browsing and loading the web pages. The heavy use of visual objects make the web complicated to a greater extent (Harper & Chen, 2012) and if the course contains these visual or multimedia material, it takes significantly longer time to load or may be the dis-connectivity due to technical hitches (Mason & Rennie, 2004) which results in the demotivation of the learners to be registered in e-learning.

RQ2: Bandwidth is one of the most important barrier in promoting e-learning (Homan & Macpherson, 2005). Learners avoid to get registered in the e-learning courses due to this problem in Pakistan.

4.6. Accessibility of internet broadband

RQ1: There is no doubt internet technology has removed the constraints of time and distance for both the teachers and the learners. Broadband is more than a communication technology, it is an economic way to be online with the economic world. But in developing countries like Pakistan, access of internet broadband is one of the major hindrances in promoting the e-learning. Learners of the remote and rural areas have the same requirements of broadband access as of the learners of urban and semi-urban areas. Moreover, high speed network access makes it possible to perform distance oriented applications and services like e-learning (Mason & Rennie, 2004). The Internet subscriber population is 2.4 million with less than 30,000 DSL subscribers across the Pakistan. The entire broadband population of Pakistan in the year 2012 is 2,101,315 (PTA, 2012). According to Table 4, the average annual growth rate of broadband subscribers is approximately 127% for the last five years.

RQ2: A lot of efforts are still required to provide broadband access to the learners of remote areas, so that they may not leave their places for the sake of higher education.

4.7. Power failure

RQ1: Successful implication and execution of e-learning requires an un-interrupted supply of electric power. Almost all communication equipment needs continuous and steady supply of power to operate. Unfortunately, Pakistan is in the crisis of power generation for the last 8 years. The cost of maintaining reliable power supply must be considered (Sangi, 2008) while switching to the e-learning environment.

RQ2: This issue is creating a major hindrance in the successful implementation and adoption of the e-learning system in Pakistan.

4.8. Lack of ICT enabled students

RQ1: Success in the world of e-learning demands a new way of literacy and expertise from the students (Oliver, 2001). Prior knowledge of computing is essential for ~~the~~ students before enrolling in the e-learning course. Beside prior knowledge, the use of computers in the classrooms for the education purpose is still low (Watson, 2006).

Table 4
ICT Statistics of Pakistan (PTA, 2012).

Year	No. of subscribers
2006–07	45,153
2007–08	168,082
2008–09	413,809
2009–10	900,648
2010–11	1,491,491
2011–12	2,101,315

RQ2: Currently in the HEIs of Pakistan, there are many students who are not capable to support their studies and research with the latest ICT. Dream of e-learning cannot be achieved unless and until these learners are provided with the proper training to operate the computers and to get maximum utilization from the ICT.

4.9. Practical arrangements for practical oriented course

RQ1: Some subjects like Physics, Chemistry, Biology, Sports, and Engineering etc. require intense laboratory work while studying. Testing and implementation of the theoretical knowledge is only possible through laboratory learning. There is a need of arrangements to be made for the practical in the laboratory in order to cope with the successful adoption of the e-learning system.

RQ2: It seems difficult to ensure that the learner has performed the entire necessary practical in the laboratory before taking the examination of that course. This issue has a negative impact in successful adoption of the e-learning in Pakistan especially for the practical oriented courses.

4.10. Cost of mobile internet

RQ1: In Pakistan, the use of mobile phone is gaining attention regardless of the age and socio-economic status. The increase of the mobile phone subscribers as compared to the computer users can be easily seen from Table 5. With the growth of the telecom and mobile industry these mobiles phones are more than a simple phone. They have now become smart phones. These smart phones have the capabilities as of a computers had a few years back (Wains & Mahmood, 2008). Furthermore we can enjoy using MS Office, Acrobat on these mobile phone devices as well. Learning can be happened anytime and anywhere irrespective of the permanent internet connection.

RQ2: Smart phones can be used in the remote areas of Pakistan, where landline broadband is not accessible. But due to the high cost of accessing mobile internet is becoming an obstacle in the successful adoption of the e-learning in Pakistan.

4.11. Lack of ICT enabled teachers

RQ1: There is a shortage of qualified and trained faculty members in the HEIs of Pakistan. Whereas HEIs are facing extreme shortage of the ICT enabled teachers. Lack of ICT skill is one of the barriers for the promotion of the e-learning (Carr, 1999). Moreover shifting from the traditional teaching environment to the e-learning environment is difficult for the teachers because they are used to and comfortable with the old traditional teaching environment (Wong, 2007). They need to revise their course and teaching material from hard mode to the electronic mode. Quite a large number of teacher in the HEIs are not familiar even with the usage of the necessary software for the production of the course material and moreover they also do not want to change their teaching style (Levy, 2003). As teachers are not ICT enabled so they often under-estimate the power of e-learning that it is same as of the face-to face teaching (Palloff & Pratt, 2000). Furthermore, it is required to enhance the teacher's training for utilizing the ICT, i.e. teachers should know how they can improve

Table 5
Key Indicators (Source: International Telecommunication Union and Pakistan Telecommunication) (Wains & Mahmood, 2008).

	Penetration/100 people	Year
TV	8.17	2003
Radio	7.26	2003
Computers	0.52	2005
Cell Phones	37.58	2007

the quality of their students' and their own work (Põldoja, Väljataga, Laanpere, & Tammets, 2012). Hence the basic ICT literacy skills are considered essential for the effective and meaningful learning (Nawaz & Khan, 2012).

RQ2: The course contents are still not refined due to the shortage of the skilled teachers. This seriously hampers the quality of the course contents and this leads to slow down the learning of the learners. This is creating difficulties in the successful adoption of e-learning in Pakistan.

4.12. Lack of interest of faculty

RQ1: Instructors are the key personnel in delivering the knowledge, skill and education. Their interest is considered as a prime factor for the success of teaching and learning. The faculty members of the public sector universities are not keen in developing the e-learning environment. As e-learning shifts from the teaching centered to the learners centered. This paradigm shift has challenged the traditional banking concept of learning, in which the teacher plays an active role in imparting education. The traditionalists cannot support e-learning as it goes against their basic educational assumptions (Forman et al., 2002).

RQ2: It is not possible to implement and adopt e-learning environments in Pakistan, without the interest and motivation of the faculty members. The lack of interest of the faculty members is creating obstacle in the successful implementation and adoption of e-learning in Pakistan.

4.13. Lack of resources

RQ1: Due to the continuous reduction in the education spending in Pakistan, the HEIs of Pakistan are facing extreme shortage of funds and resources. AIOU is striving hard to meet the growing needs of the learners of e-learning mode of education. VU is still having most of the material in the form of video tapes only. The other HEIs of Pakistan still do not have such minimum resources to implement and execute their e-learning programs. These HEIs are operating in both the traditional and the distance learning modes simultaneously.

RQ2: Huge funding is required from the HEC of Pakistan to facilitate the HEIs of Pakistan in order to make them capable of developing their own e-learning resources at the local level. Shortage of adequate funding is critically preventing these universities to switch to this mode of learning.

4.14. Socio-cultural norms

RQ1: Approximately 40% of the total population of Pakistan is young and under 19 years of age, which indicates that Pakistan has relatively young human resource. More than 300 different languages are spoken in the various regions of the country, but English has been adopted as the official language for education, industry and commerce (Unicef, 2011). People of remote areas and especially from the provinces of Baluchistan, KPK and Gilgit-Baltistan do not like their females to move from their places to urban areas for the sake of education. Education of female in these areas is also banned on the basis of religion as well (Latif, 2011).

RQ2: This factor is also hampering the education of learners especially the females of these provinces of Pakistan. If the e-learning environment is successfully implemented, then the learners from these remote areas of Pakistan will be able to get education within their social and cultural constraints.

4.15. Literacy rate

RQ1: According to Pakistan Social and Living Standards Measurement in a latest survey 2012–13 that the overall literacy rate of the population (10 years and above) is 60 percent (male: 71% and female: 48%) which is 2% percent higher than the previous year (i.e. 58% in 2011–12) (Finance, 2014). However, other sources including educational experts, have claimed that the overall literacy rate is about 26%, they argue that the higher figures of literacy rate also include the people who are able to read and/or write a little more than their name and signature (Latif, 2011).

RQ2: Lower literacy rate is creating an obstacle in promoting e-learning in Pakistan. It seems that a large number of populations cannot appreciate the significance of e-learning due to their illiteracy. Hence, learners either are not willing to adopt e-learning or hesitate to rely on the ICT for their education.

4.16. Lack of formal implementation process

RQ1: Institutional visions, long-term aims, goals, established procedures and standards are necessary for the successful implementation of the e-learning system. It depends upon the HEIs that how much these institutions enforce their policies to achieve their goals and how these institutions utilize their existing resources for the successful implementation and execution of the e-learning system (Masoumi & Lindström, 2012).

RQ2: This issue is creating a hurdle in the successful implementation of the e-learning system in the HEIs of Pakistan. Still there is a need to set clear goals and to develop standardized procedures to meet the increasing demand of e-learning in Pakistan. Moreover, political factor is also influencing the HEIs in adopting and implementing the e-learning in Pakistan.

5. Taxonomy of critical issues

In this study, we have also developed the taxonomy of the identified critical issues of implementing the e-learning in Pakistan. The taxonomy is depicted in Table 6. According to the literature review, the dimension of Software has never been considered as a dimension in the context of e-learning issues. Our review suggests that it is a very important dimension which deals with the development of an e-learning product. The e-learning product is a piece of software that is developed for learning purposes, such as a small simulation, static html-pages, power point slide or online courses (Berger & Rockmann, 2006; Khattak, 2010). Moreover, the process model used to develop an e-learning product is identical to the traditional SDLC Process Model (Punyabukkana, Sowanwanichakul, & Suchato, 2006).

The issues related to the instructional design, software quality assurance and instructional designers are grouped in the Software dimension as these issues are related to the software engineering area. Technical issues like bandwidth, internet broadband, cost of accessing mobile internet and power failure are grouped in the Technical dimension. The issues of practical arrangements for practical oriented courses, lack of resources/funds and the lack of formal process to implement the e-learning in the HEIs of Pakistan are related to the institutions providing e-learning facilities are collected in the dimension of Institution. The issues which are related to the learner and teachers are placed in the dimension of Personal. These issues include the lack of interest of faculty in adopting the e-learning, lack of skills in ICT of both the faculty and the student. Similarly, the Cultural dimension contains the issues associated with the culture of Pakistan like socio-cultural norms, literacy rate and the lack of LOs in local language (language barrier).

Table 6
Taxonomy of critical issues.

Objective	Dimensions	Critical Issues
Critical issues of E-learning in Pakistan	Software	Lack of instructional designer
		Lack of instructional design process
		Lack of software quality assurance process
	Technical	Bandwidth
		Accessibility of Internet broadband
		Cost of mobile internet
		Power failure
	Institution	Practical arrangements for practical oriented courses
		Lack of resources
		Lack of formal implementation process
	Personal	Lack of interest of Faculty
		Lack ICT enabled teachers
		Lack ICT enabled students
	Cultural	Lack of LOs in local language
		Socio-cultural Norms
		Literacy rate

6. Prioritization using AHP

AHP is a powerful and flexible process used to make decision to develop priorities amongst different attributes. This process has been proposed by Saaty (1977). Beside flexibility, the other advantage of using the AHP as compared to other multi criteria techniques, is its capability of checking inconsistences and its intuitive appeal to the decision makers (Ramanathan, 2001). Moreover, mostly users feel comfortable with the pairwise comparisons. Additionally, the AHP technique has a unique advantage that it builds hierarchies of criteria by disintegrating a complex decision problem into several relevant components. AHP has been broadly used to reflect the importance or weight of each component (criterion) associated to priorities (Macharis, Springael, De Brucker, & Verbeke, 2004; Zahedi, 1986). Due to this reason, we propose to use the AHP method to develop the hierarchy and prioritize the critical issues of e-learning in the context of HEIs of Pakistan. AHP has been used to develop the taxonomy of critical issues of e-learning (as discussed in Section 5). The devised taxonomy consists of three layers including the objective of the research, the dimensions and the critical issues associated with each dimension. The weight of each issue has been calculated by using an AHP software and Microsoft Excel 2010. The responses that have not met the consistency ratio have been excluded, as the consistency ratio is considered to be less than or equal to 0.10 (Saaty, 1980). The basic procedure to carry out the AHP method comprises on the following steps (Salmeron & Herrero, 2005);

(a) The complex decision problem is required to be decomposed into a hierarchy of interrelated elements (issues in this case).
(b) Data is to be collected using pairwise comparisons of former elements (issues) and the attribute's weights have to be computed using the Eigen value method in each level.
(c) The weights of categories (dimensions) have to be calculated.

Data has been collected by using the AHP questionnaire from our sampled e-learning experts. Nineteen (19) participants responded to the AHP questionnaire for a response rate of 95%. One (1) response has been removed due to the high consistency ratio; however rest of the eighteen (18) of the responses has been included as they meet the criteria of the consistency ratio.

6.1. Results

Table 7 depicts that the Software dimension (0.4540) has emerged as the most important dimension for the promotion of the e-learning. However, the Personal dimension (0.0320) has given the least importance by respondents for the implementation and promotion of the e-learning in the HEIs of Pakistan. The overall weights and the ranking of the dimensions are illustrated in Table 7.

Table 8 depicts the local weights of each critical issue along with the associated rank in the respective dimension.

Whereas the global weight of each of the critical issue along with the related rank is depicted in Table 9. Lack of software quality assurance process (0.2942), lack of resources (0.1193), lack of formal implementation process (0.1066), lack of ID process

Table 7
AHP weights and dimension rankings.

Dimensions	Weights	Ranking
Software	0.454	1
Technical	0.158	3
Institution	0.245	2
Personal	0.032	5
Cultural	0.111	4

Table 8
AHP weights and critical issues ranking.

Critical Issues	Weights (local)	Rank (local)
Lack of instructional designer	0.1220	3
Lack of ID process	0.2300	2
Lack of SQA process	0.6480	1
Bandwidth	0.1720	2
Accessibility of internet broadband	0.0960	3
Cost of mobile internet	0.0740	4
Power failure	0.6580	1
Practical arrangement for practical oriented course	0.0780	3
Lack of resources	0.4870	1
Lack of formal implementation process	0.4350	2
Lack of interest of faculty	0.7390	1
Lack of ICT enabled teacher	0.0760	3
Lack of ICT enabled students	0.1310	2
Lack of LOs in local language	0.7310	1
Socio-cultural norms	0.0810	3
Literacy rate	0.1880	2

Table 9
AHP global weights and ranks of critical issues.

Critical Issues	Weight (global)	Global (rank)
Lack of SQA process	0.2942	1
Lack of resources	0.1193	2
Lack of formal implementation process	0.1066	3
Lack of ID process	0.1044	4
Power failure	0.1040	5
Lack of LOs in local language	0.0811	6
Lack of instructional Designer	0.0554	7
Bandwidth	0.0272	8
Lack of interest of faculty	0.0236	9
Literacy rate	0.0209	10
Practical arrangement for practical oriented course	0.0191	11
Accessibility of internet broadband	0.0152	12
Cost of mobile internet	0.0117	13
Socio-cultural norms	0.0090	14
Lack of ICT enabled students	0.0042	15
Lack of ICT enabled teacher	0.0024	16

(0.1044) and power failure (0.1040) are considered the top five critical issues in implementing the e-learning in the HEIs of Pakistan. Whereas the global rank of each of the critical issue is depicted in Table 9.

7. Conclusion

E-learning is one of the tools emerged from the ICT and it has been incorporated in many university programs around the globe to enhance the learning of the distant learner. E-learning did not grow at a rapid pace as compared to the growth and advancement of ICT in developing countries. The HEIs of the developing countries like Pakistan are interested in switching to this new paradigm of learning and training. Some issues like lack of implementation process, quality assurance of e-learning system, development of localized learning objects socio-cultural norms and literacy etc. are creating hindrances in the successful implementation and adoption of this learning paradigm. We have conducted this study in order to identify new barriers specific to the developing countries which are creating problems in the successful adoption and promotion of the e-learning. This study contributes by identifying and prioritizing the current critical issues faced by the HEIs of Pakistan in shifting from the traditional to the e-learning environment. Our study also contributes by developing the taxonomy and classifying them into different dimensions of e-learning including software, technical, institutional, personal and cultural. The identified critical issues are creating an uncertainty about the adoption and continuous use of this learning paradigm in Pakistan. This study has identified at least 16 current critical issues which are acting as the barriers in the journey of the HEIs of Pakistan toward e-learning. AHP has been used to rank the identified issues with respect to their importance for the localized environment. Need of quality assurance model for e-learning systems, deficiency of e-learning resources, lack of implementation process and the lack of instructional design process, are the more crucial and important issues. The identified issues need immediate attention and priority by the government agencies dealing with the higher education in Pakistan. The significance of a successful e-learning system can only be achieved when the issues are fully measured and resolved. The education policy makers of Pakistan should consider more critically and deeply about the ways how transformation to this new paradigm of lifelong learning comes to reality. The HEIs of Pakistan must understand and evaluate the factors that drive their learners and teachers toward the e-learning system.

There is a lot of room to work for the improvement of current practices of e-learning in Pakistan. This exploratory study is the first step toward the identification of critical issues facing by the HEIs of Pakistan. The development of a quality assurance model for the e-learning system, development of LO process model and the significance of outsourcing localized LO on quality, are some of the future directions on which we are currently working.

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