Factors Influencing the Adoption of e-Learning in an Open and Distance Learning Institution of Pakistan

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Abstract: The revolution in technology has led to new approaches toward open and distance learning, particularly in the form of e-learning. E-learning governs the system of modern education by using Information and Communication Technology (ICT). There are different design approaches and interpretations of e-learning, primarily involving variations in instructional strategies and pedagogical models employed with the technology. These innovations offer compelling opportunities to educational institutions, students and faculty alike, yet they have also posed formidable challenges for e-learning. This is especially the case in the developing countries. This paper engages the concept and aims of e-learning with regard to the issues in the developing countries. The next part of the paper presents the need of e-learning in Pakistan and describes the major institutes offering e-learning and distance education as an alternate mode of education. The paper also elaborates major challenges of e-learning and explores the influencing factors for the adoption of e-learning in Pakistan. The important factors are investigated in terms of available ICT infrastructure and other country specific parameters. The paper also presents results of a survey that was conducted to evaluate students' preferences regarding e-learning. The survey result demonstrates a strong preference for e-learning by the students. The paper concludes by presenting a generalized model of e-learning that can fulfill the needs of leaners under available technology infrastructure.

Keywords: E-learning, open and distance learning, Information and Communication Technology, Pedagogy, factors, infrastructure

1. Introduction

Open and Distance Learning (ODL) is a non-traditional mode of schooling which is characterized by separation of students and teachers in place or time (Modesto and Gregoriose, 2016). The geographical and time separation is managed by alternate means of instruction delivery to distant learners. ODL is a form of second chance for school leavers who fail to get formal education. It is especially an opportunity for girls at home who are unable to get education in the formal system of education due to financial, cultural or other reasons (Abimbola, Omolara and Fatimah, 2015). Therefore it provides a flexible opportunity in which students can manage learning time and contents at their own pace (Perraton, 2012). The alternate delivery mode is influenced by the evolution of information and communication technology. As a result, e-learning has emerged as a process of education and training through technology (Naidu, 2006).

E-learning covers various aspects of computer and technology including internet based learning also called online learning. Ong, Lai and Wang (2004) highlights e-learning as instructional tutorial or learning practice delivered using electronic technologies including the Internet, intranets and extranets. Markus (2008) conceptualizes e-learning as an instructional process formed by interaction with digital content by using communication network and services and teacher's support in a distant learning environment. Therefore, technology and pedagogy are integral components of e-learning (Moore et al., 2011), where some elaborations are closely linked with technological aspects; and others focus upon pedagogical approaches of learning mechanisms using different instructional strategies (Hadjerrouit, 2007). These different forms of e-learning pose various issues and challenges which vary from technology to pedagogy especially among the developed and the developing countries.

Developed countries are more industrialized and have high per capita income levels relative to other less developed or developing nations. This gap creates an economic and digital divide that can be observed in both classes of societies (Ravenhill, 2017). The ICT infrastructure is more advanced and available to a wider community in the developed countries. On the other hand the developing countries are striving hard to

improve their technology lines (Chang, Wong and Park, 2016). Consequently the status of e-learning i.e. instructional strategies, learning technology and pedagogical model (Dabbagh, 2005) in the developing counties is different from the developed ones. Learning technology has the central role which facilitates the pedagogical model via asynchronous & synchronous communication tools, hypermedia & multimedia contents, and web based interactive communications. However it requires the availability of ICT infrastructure for remote learners, which is a challenge in most of the developing countries. The pedagogical model is a teaching practice, which includes open, flexible and distributed mechanisms to foster students' learning under the available technology infrastructure. Instructional strategies include exploration of learning materials, problem solving activities, localized expression, and reflection, which needs to be addressed in the low and medium-tech countries, especially Pakistan.

Keeping in view the above considerations, this paper is study about the status of e-learning in developing countries, taking Pakistan as a case study. The objective is to explore the factors that influence the adoption of e-learning in an ODL institution of Pakistan. The paper brings to light the availability of technological facilities necessary for e-learning, preferences of students and hurdles in adoption of e-learning through a survey conducted from the students of country's largest Open University. The rest of the paper is organized as: section 2 summarizes the issues of e-learning in the developing countries, section 3 presents the status of e-learning in Pakistan and highlights the associated challenges and opportunities, section 4 presents the research methodology and discusses the results of the survey conducted from students of Allama Iqbal Open University (AIOU). Finally, section 5 concludes the paper.

2.   E-learning in Developing Countries

Use of ICT in education in developing countries has progressively advanced during the last two decades due to improvements in technology and service infrastructures; including wider availability, and strength of Internet connections (Omidinia, Masrom and Selamat, 2011; Williams, Mayer and Minges, 2011). This has enabled new and increased opportunities for teaching and learning. However, challenges such as interactive learning with active participation of students are still lacking and educational systems are still relying on more traditional approaches that have yet to leverage the dividends of technological and pedagogical innovations (Andersson and Grönlund, 2009). There are many issues of e-learning in developing countries; some major challenges are summarized in table 1.

Table 1: Challenges of E-Learning in the Developing Countries

Study	Country	Challenges
Andersson (2008)	Sri Lanka	Student support system, flexible learning in terms of anywhere any time, infrastructure accessibility, confidence based on previous experience of learning, locally prepared materials and attitude towards e-learning acceptance.
Mnyanyi, Bakari, and Mbwette (2010)	Tanzania	Low Internet bandwidth, expertise in e-learning; ICT infrastructure, availability of funds, cost of e-learning equipment and after sale service.
Omidinia, Masrom and Selamat (2011)	Iran	Enabling processes, lack of e-learning expertise, proper use of open source systems and one-time funding
Kahiigi et al (2011)	Uganda	Technical Issues: Low bandwidth, accessibility of computers & Internet, computer skills, support services and cost. Pedagogical issues: Delay in feedback, conflict resolution, self-esteem and little face-to-face component.
Khan, Hasan, & Clement (2012)	Bangladesh	Technical infrastructure, computer skills, lack of funds, political situation, lack of policies, time and cost of development.
Tarus et al. (2015)	Kenya	E-learning infrastructure, Internet bandwidth, lack of e-learning policies, technical competency, high development cost of e-learning tutorials, computer competency of students and teachers.

Students in many developing countries also struggle with personal confidence and literacy associated with use of technology (Tarus, Gichoya and Muumbo, 2015), experience of use and available local infrastructure (Kahiigi, et al.,2011). The technology confidence model needs to be enhanced with a consistent, open-ended, less expensive, and equally distributed local ICT infrastructure. The technology based learning environments require special considerations of socio-cultural norms of the learners (Masoumi and Lindström, 2012). These include language, traditions, culture, religion, and ethics. Therefore, specific material or wording in course instructions may not be suitable to all and may create a clash of cultural identity among learners. Developing countries, especially Pakistan, are also facing power failure issues. There is a need to give more freedom and

flexibility to learners by allowing learner-led activities at their own pace and schedule to accommodate these personal and infrastructure issues.

3. E-learning in Pakistan

Pakistan is a developing country that is progressing to enhance the educational standards from early childhood to higher education. The overall situation in terms of enrolments, number of institutions, and teachers has shown improvement in educational sector (Pakistan Economic Survey, 2016). However, the present infrastructure is insufficient to meet the needs of higher education. Major problems of education in Pakistan include a lack of trained teachers, deficiency of proper teaching materials, non-availability of facilities, assessment systems and inadequate resources (Bilal and Khan, 2012; Memon, 2007). The lack of resources in the country is affecting the socio-economic growth of the country. This has motivated interest in, and efforts to create alternative solutions in the form of distance education and e-learning.

In Pakistan there are two distance education universities (1) Allama Iqbal Open University (AIOU) and (2) Virtual University of Pakistan (VU). AIOU was established in 1974 as first Open University in country and second in the world. It is the only Mega University in the country. Traditional distance education is the primary mode of instructional delivery, covering a major portion of AIOU's educational programs. The university is also providing online education in selected programs and courses (Vice Chancellor Annual Report, 2016). The model of online learning at AIOU is conceptualized as the Open Learning Institute of Virtual Education (OLIVE) and subsequently many e-learning activities have been initiated (Sangi and Ahmed, 2015). A model of multimedia instruction object development was presented for AIOU courses (Daud, 2009). The delivery mechanisms were established to provide for accessibility of online courses to distant learners (Sangi, 2009). The e-assessment services were developed under the organizational rules using the local technology infrastructure (Sangi, 2008).

The second distance learning institute is the Virtual University (VU), which was established in 2002 under a project initiated by IT and Telecommunication Division, Ministry of Science and Technology, Government of Pakistan. VU offers modern distance learning programs using ICT based services (Virtual University of Pakistan, 2016). The VU mostly relies on video lectures developed for each academic course and broadcast over VU TV channels. VU provides local laboratories for students to come, practice or listen to video lectures and take online examinations. VU also uses Internet to disseminate lectures and for submission of students' assignments (Ali, Ahmed, Shaikh and Bukhari, 2011). Both universities are trying their level best to provide e-learning programs. However, they are coping with certain common issues and challenges of e-learning that need to be tackled properly. The study (Sangi and Ahmed, 2015) revealed that students' accessibility and outreach have grown considerably with the passage of time that has encouraged more students to adopt e-learning programs. However, existing e-learning programs are facing some challenges that need to be addressed effectively.

3.1 Challenges of E-learning in Pakistan

The table 2 reveals various challenges of e-learning in Pakistan. The power crisis is one of Pakistan's major hurdles in promoting e-learning in the country. The other infrastructure problem includes the Internet bandwidth. The present prevailing models of e-learning are sought from technologically advanced countries. These models do carry International standards of e-learning but with least emphasis on localization. Therefore, the use of instructional design in e-learning is rare in the localized environment. The accessibility of e-learning services has also not been considered for distant learners. There are pedagogical issues like the majority of students only have the ability to understand basic simple English. The formal text books designed for the traditional face-to-face learners are not suitable for distant learners. The multimedia contents are not available to meet the diverse needs of distant learners.

Table 2: Challenges of E-Learning in Pakistan

Challenges	Study
Electricity issues	Sangi (2008); Iqbal, and Ahmad. (2010)
Absence of utilization of an Instructional Design Process	Daud (2009)
E-learning accessibility	Sangi (2009)
Diversity in educational environments:	Nawaz and Kundi (2010)
Borrowed model of e-learning	Nawaz and Zubair (2012)
Internet bandwidth	Sana and Mariam (2013); Sajid and Hassan (2013)
English language competency	Qureshi et al (2012)
Learning styles	Hameed, Shaikh and Hameed (2012)
Traditional books/lectures	Ahmed and Sangi (2017)
Unavailability of multimedia contents	Ahmed and Sangi (2017)

In order to focus on afore mentioned issues, there is a need for a generalized e-learning model for Pakistan which should comply with both national and International parameters. The available local ICT infrastructure and preferences of local learners may be evaluated to address the needs of local learners. These standards may be employed as an opportunity for the development of a generalized e-learning model.

3.2 ICT Infrastructure for E-learning support

ICT plays a vital role for disseminating e-learning programs. It handles and manages the delivery and communication through the use of computers and Internet. There are various parameters and services of ICT contributing in the evolution of e-learning in Pakistan.

3.2.1 Growth of ICT Industry

The Government of Pakistan has established a separate entity, the Ministry of Information Technology (Ministry of Information Technology, 2016), to promote the ICT industry. The country is facing electricity power failures, yet even in these challenging conditions, the ICT revolution in country is moving forward at a faster pace. The ICT industry in Pakistan generates over two billion UD dollars in revenue each year, which shows significant growth in ICT in recent years (Pakistan Software House Association, 2016). The number of computers in Pakistan has also increased by 35% during the last decade, adding around 450,000 new computers each year (Sajida, 2013). At present, ICT has become an integral tool for many individuals, offices, homes and business centers. Many new opportunities are available in various governmental and non-governmental organizations to support ICT infrastructure, IT business, software development, and service sector. Similarly, IT education has also grown in almost all institutions of learning.

3.2.2 Internet Broadband Subscribers:

Another important parameter is the number of Internet broadband subscribers in the country. The facts (Pakistan Telecommunication Authority, 2017) are given in fgure 1:
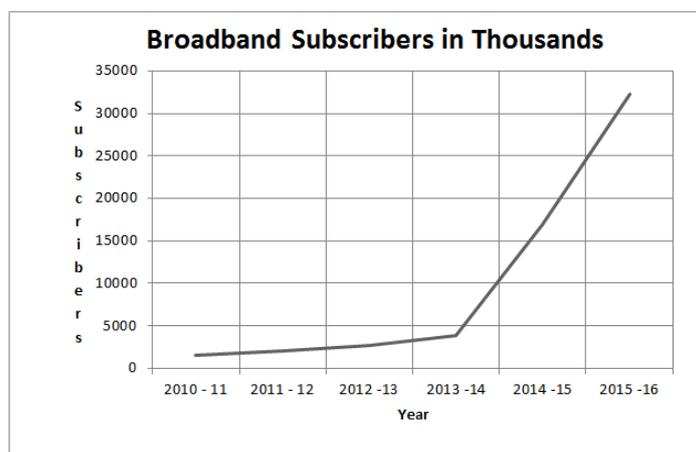

Figure 1: Broadband Subscribers

The analysis indicates that number of Broadband subscribers is increasing at an exponential rate. There is an almost ten times increase in number of users in last six years, demonstrating that access to Internet is increasing with the passage of time. The government has been promoting Internet facilities in far-flung areas. Approximately 50 Internet Service Providers (ISP) are providing Internet connections throughout the country (Internet Service Providers Association of Pakistan, 2017).

3.2.3   Cost of Internet:

The government is allowing new companies to offer Internet broadband services in Pakistan. As a result, the cost of Internet access in Pakistan has reduced to a great extent over the past few years (Pakistan Telecommunication Authority, 2017). Many service providers offer special packages for students and teachers. The ability to receive Internet access at a reasonable cost may become one of the driving forces to promote e-learning based academic programs.

3.2.4   Introduction of 3G/4G Technology:

The mobile phone operators in Pakistan are offering 3G/4G technologies to subscribers with high-speed internet at reasonable rates (Pakistan Telecommunication Authority, 2017). It enables them to download and play indigenous multimedia e-content.

There are various challenges of e-learning in Pakistan as reported in the literature review (table 2), but there is a bright future ahead as various opportunities are also available. The ICT indicators also reveal that the use of computers, internet and mobile technologies are continuously increasing in the country, moving the society further toward an ICT enabled culture in the country. The potential of computers and internet can be an asset to promote e-learning activities in the country. The ICT support parameters provide capability to support adaptable e-learning models through inexpensive and fast instructional delivery. The specialized e-learning models may be developed and deployed across the local networks. In order to utilize the potential of ICT for specialized e-learning models, access to computers and internet among students was further investigated. The e-learning survey was conducted from Computer Science students at AIOU. The next section discusses the survey results.

4.   Research Methodology

4.1 Research Design:

The survey research methodology was applied in the study. A questionnaire containing closed ended questions based on likert scale was developed. The questionnaire was validated though educational technology experts. It was modified in light of feedback and the final questionnaire was comprised of three main sections i.e. personal information, e-learning challenges and preferences.

4.2 Sampling and Population

The research study selected the students in two major programs i.e. Bachelor of Science in Computer Science: BS (CS) and Post Graduate Diploma in Computer Science: PGD (CS) at AIOU. As many as 400 students from main campus and five (05) AIOU study centers across the country were selected and given questionnaires. The sampling scheme and response is given in table 3:

Table 3: Sample & Response

Forms Distributed	Forms Received	Response Rate
400	252	63 %

These responses are analyzed using SPSS and Excel packages and results are presented below:

4.3 Survey Results

4.3.1   Demographics:

The demographics results are shown in figure 2. The demographic results were evaluated in terms of the geographical location of respondents. The results reveal that a large proportion of respondents (73.4%) are living in urban areas, whereas 9.9 % live in semi-urban environments, and 16.7% are from far-flung areas. The results confirm that CS programs of AIOU have spread successfully to rural and semi-urban areas. During the

analysis of their program of study, it was found that a large number of the respondents (71.4%) are studying in 16 years BS (CS) and 28.6% are pursuing PGD (CS). The results further highlight that a sizeable number of respondents got employed during their studies (32.9 % private employee, 16.3 % government employee and 50.8 % unemployed). Approximately half of the students are managing both work and study at the same time. This illustrates the great potential for e-learning as an alternative teaching mode. The demographic analysis also revealed that a large majority (71.4 %) belong to 21-30 year of age bracket. The 17.9 % students are younger than 20, and 8.3 % are 31-40 year of age. While the majority of students are 21- 30, it is interesting to note that senior citizens by the ratio of 2.4% are also found among AIOU students.
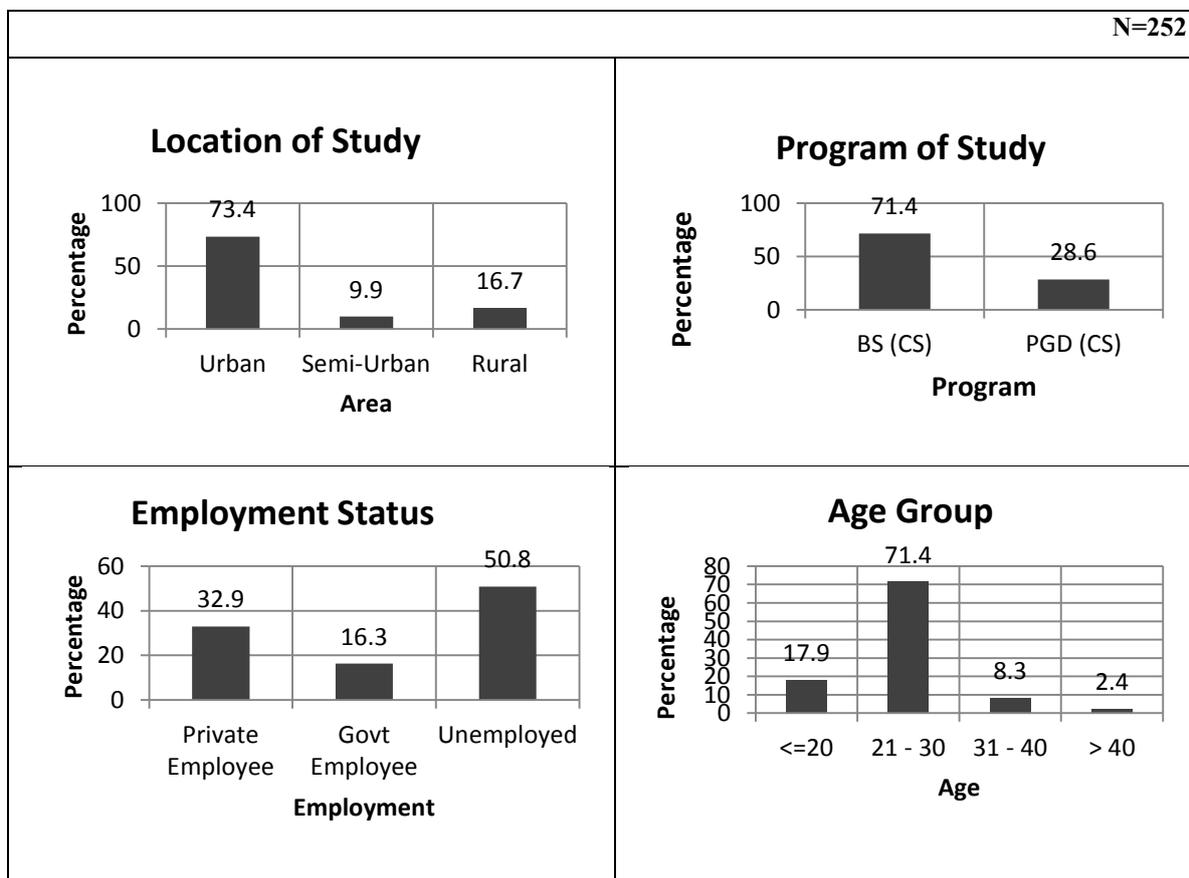

Figure 2: Student's Demographic Profile

4.3.2   Device Accessibility:

The analysis of device accessibility by location is given in table 4. The mean value 3 or above is considered favorable to the device accessibility as 5 was the highest positive point on a likert scale 1-5. The results of table 4 show that respondents have access to ICT devices. The mean values of computers & laptops for urban and semi urban areas are 4.3 and 4.2 respectively showing that the devices are highly accessible in these locations. However, these are slight less accessible in rural areas because mean value is slightly less i.e. 3.7.

Similarly the value is above than 3.5 for location parameter indicating high mobile phone intensity in urban, semi urban and rural areas. The mean of broadband at home for semi urban respondents is 4.1 as compared with 3.9 for urban and 2.7 for rural households which indicates that that the broadband at home is more accessible in semi urban and urban areas and less accessible in rural areas. However, the broadband at institution/office is almost equally accessible to students of all areas. The same is the case of mobile Internet.

Table 4: Device Accessibility by Location   N=252

ICT Devices	Urban		Semi Urban		Rural		Chi-Square	P - Value
	Mean	SD	Mean	SD	Mean	SD		
Computer /Laptop	4.3	1.0	4.2	0.9	3.7	1.3	32.49	.000
Mobile Phone	3.9	1.2	4.0	1.4	3.5	1.2	19.20	.014
Broadband (e.g. DSL) at home	3.9	1.4	4.1	0.7	2.7	1.4	46.43	.000
Broadband Institution/Office	3.1	1.4	3.3	1.3	3.3	1.4	6.62	.578
Mobile Internet	3.0	1.4	2.9	1.2	3.1	1.3	5.07	.750

The significant level (p - value) for computer/laptop, mobile phone and broadband at home is less than 0.05 which reveals that strong association exists between the location and accessibility variables. It shows that computer/laptop, mobile phone and broadband at home are more accessible to students residing in urban and semi-urban areas as compared to rural areas. The further results show that p-value is greater than 0.05 in case of broadband at office and Mobile Internet and, therefore, has no significant difference for urban, semi-urban and rural areas.

The analysis of device accessibility by gender is given in the table 5. The results of table 5 show that respondents have access to ICT devices. The mean values of computers & laptops for male and female are 4.3 and 4.2 respectively, which shows that most of the male and females students have their own computers or laptops. In case of mobile phones, the mean value is 3.8 for both genders showing high accessibility of mobile phones. The use of Broadband (e.g. DSL) at home has been found a slight greater among female as compared to male respondents. However, the use of Broadband at Institution/Office is slightly more among male than female respondents. Furthermore, the mean value for Mobile Internet is more for female (3.1) as compared to male (2.9). However, the significance level (p value) is greater than 0.05, which shows that there has not been found any significant difference regarding device accessibility among male and female students. The analysis is identifying various opportunities of instruction delivery using ICT devices. The sample has been taken from the largest distant learning institute of the country; therefore, this study will be helpful to the policy makers who want to introduce new programs using ICT and modern distant learning tools.

Table 5: Device Accessibility by Gender   N=252

ICT Devices	Male		Female		Chi - Square	P - Value
	Mean	SD	Mean	SD		
Computer /Laptop	4.3	1.0	4.2	1.0	5.93	.205
Mobile Phone	3.8	1.3	3.8	1.2	3.37	.497
Broadband (e.g. DSL) at home	3.8	1.4	4.1	1.1	2.42	.660
Broadband at Institution/Office	3.1	1.4	2.9	1.4	3.18	.529
Mobile Internet	2.9	1.3	3.1	1.3	8.03	.091

4.3.3   E-learning Issues:

The analysis of e-learning issues as highlighted by respondents is given in table 6. The majority of respondents (85.2%) identified electricity as the most critical issue hindering successful implementation of e-learning. Users have to wait long times for electricity supply to resume their e-learning activities. The alternate electricity mechanisms may be used to overcome the shortage of electricity. However the ICT infrastructure including Internet was available as majority of respondents believe that infrastructure and Internet broadband are no

more problems for them to participate in e-learning activities. The other obstacles towards e-learning in accordance with the opinion of majority of respondents 82.95%, 64.7% and 62.55% are English language competency, dependency of teacher and unavailability of specialized contents, respectively. The existing contents are static in nature and cannot meet the dynamic need of distant learner. The language barrier creates extra burden on them and therefore the dependency of teacher remains a requirement. The e-learning contents require more interactivity than the traditional contents. The use of simple English and localized examples may help to understand the contents and reduce the dependency on teachers. The findings confirm the investigation of e-learning issues mentioned in table 6.

Table 6: E-learning issues   N=252

e-learning issues	Response (%)	
	Yes	**No**
Electricity issues	85.2	14.8
English Language Competency	82.95	17.05
Dependency on teacher	64.7	35.3
Unavailability of Specialized Contents	62.55	37.45
Lack of Infrastructure	38.15	61.85
Internet Bandwidth	35.75	64.25

4.3.4   E-learning Preferences:

E-learning preferences have also been investigated to find the liking of students about e-learning. The analysis of respondents is given in table 7. The results reveal that the respondents are keen to have e-learning facilities from AIOU. The mean value ranges from 3.38 to 4.20 and standard deviation ranges from 0.94 and 1.22, which reflect that a majority of the respondents want to be benefitted from e-learning services offered by AIOU. The mean values of common information/FAQ, electronic information and interaction with teacher via internet are comparatively higher, favouring the idea that most students strongly prefer information via online modes.

Table 7: E-learning Preferences   N=252

I would like the following online services from AIOU	Mean	SD
Teacher interactions,(Tutorial/QA sessions etc.) using Internet	4.20	0.92
Well-structured content developed in simple English	4.10	1.05
Common information and FAQ	4.04	0.94
Electronic materials/instructions manuals etc.	4.00	0.90
Electronic content that match my style of learning	4.00	1.00
Allow my own pace during available electricity hours	3.92	0.98
Individual attention	3.90	0.98
Teacher interactions using Radio/TV/Video Conference	3.38	1.20
Online problem solving by the university using Internet	3.87	1.22
Assignment/Course outline download	3.84	1.07
Online assessment by the teacher/tutor using internet	3.67	1.19
Teacher interactions using telephone	3.46	1.15

The online problem solving by the university indicates a mean value of 3.87, highlighting that the students wish to have a strong online support and complaint management systems. On the contrary, questions about the interaction via Radio/TV/Video Conferencing received the lowest mean value. It explains the fact that the lectures through audio visual aids, radio and TV are one-sided and lack active students' participation and discussions. Interaction via telephone received a higher preference than Radio/TV that shows the strong possibility of Mobile Learning as a potential future method of delivery.

The analysis of the results further reveals that the respondents have referred individual attention as better option for their learning skills. The majority of learners want the contents that match their learning styles and may comprise of different format of contents (e.g. Text, Multimedia, Radio, TV, Mobile, Internet etc.). They want well-structured contents developed in simple English that that they can learn at their own pace especially during available electricity hours. The mean values and standard deviation have shown significant preferences of students towards adaptable e-learning.

Keeping in view the review of literature and survey results, a generalized e-learning model is proposed which can be replicated in other environments as shown in figure 3. The model which is based on adaptivity in e-learning (Ahmed and Sangi, 2017) is comprised of content model, student model, online pedagogy and communication interface. The content model manages the media objects of varying types and format that match with the learning styles of students. The student model keeps the track of student portfolios, actions and preferences. The online pedagogy aligns the learning objects as per needs of students and deliver the contents using the communication interface. The proposed model has been pilot tested on selected courses being offered by AIOU for computer science students and the model has been successful in enhancing the opportunities of learning for students in an ODL environment. Furthermore, the knowledge level of those students using the adaptive model was also better than students using traditional way of learning as depicted by the examination results.
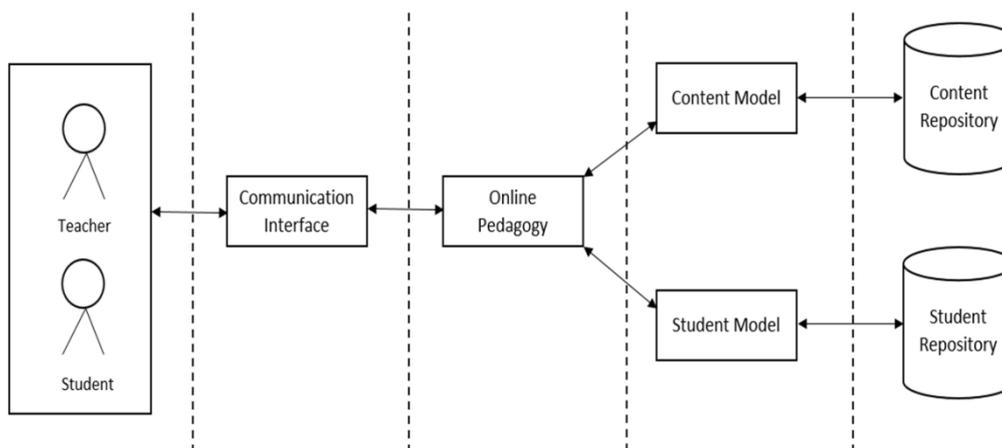

Figure 3: Proposed Model of E-learning

5. Conclusion

Technology is an important feature of e-learning in an ODL environment in order to support instructional strategies that use online pedagogical methods. However, the amalgam of many factors has posed many challenges for implementation of e-learning, especially in developing countries. This paper has investigated the general problems and perceptions of e-learning in developing countries. The case of Pakistan has been presented with more specific issues and challenges of e-learning. The paper has also elaborated the status of e-learning in distance education institutes of the country. Further, influencing factors in Pakistan in terms of ICT growth, Internet broadband subscribers and cost of internet and 3G & 4G technologies have been presented. A survey was conducted with local students in order to determine their views about challenges and priorities in terms of e-learning. The survey results showed that main issues of e-learning are electricity shortfall, English language competency, non-availability of specialized contents and dependency on teacher. The results established the finding of existing studies about the challenges of e-learning in Pakistan. However; the ICT infrastructure and Internet bandwidth were found as the emerging opportunities as highlighted by the

ICT growth parameters and also confirmed by the survey respondents. These opportunities have resulted in high preferences of e-learning by the local students.

E-learning has a great potential in Pakistan if challenges are addressed timely and effectively. The preferences of local students are high and they are eager to adopt the modern means of distance education within the available technology infrastructure. There is a great need of a generalized e-learning model for developing countries especially Pakistan which may comply with both national and international e-learning standards. The model may comprise of content model, student model, online pedagogy and communication interface. The existing local ICT infrastructure may be optimized through the provision of alternate teaching strategies during power failure with a self-learning mode. Similarly, the English competency issues may be addressed by developing adaptable contents in simple English. The learning needs of students may be addressed by defining sequence and depth in learning contents matching with the course learning outcomes. The learning contents may be enriched by giving examples from local contexts. The pedagogy of the said program may be redefined with open and closed ended activities with a consistent approach so that learners may participate in online activities with ease. Finally, a user-friendly interface may be developed to facilitate the content presentation and navigation control in easy steps. This generalized e-learning model may help the learner to acquire knowledge with concentration.

Acknowledgement

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