

# Use of Information and Communication Technologies in E-learning System of Pakistan - a comparison study

Ayesha. Sana, and Hina. Mariam

**Abstract**— In Pakistan, need of development of ICT in learning and education sector has increased. In developed countries like Sweden information and communication technologies, i.e. LMS<sup>1</sup>, multimedia, adobe connects etc., have involved innovation in traditional learning and education that is known as e-learning. Therefore a comparison is required to understand the problem of implementing e-learning in Pakistan with any developed country. This may help in the development of ICT in learning. In our qualitative research, several problems are identified that may hurdle in growth of ICT in learning and education in Pakistan. For example, limited internet access and unavailability of multimedia and adobe connect are major hurdles that students are facing while taking e-learning in Pakistan. Through overcoming these problems learners may engage with each other and also develop collaboration and teamwork skills. Moreover improvement ICTs' in education and learning may also offer independence in learning.

**Keywords**—Information and Communication Technology (ICT).

## I. INTRODUCTION

**E**LEARNING is a style of electronically supported learning that provides the web-based learning environment. There are four methods of e-Learning but asynchronous Web Based Training (WBT) is most rife. The e-Learning process consisting of certain steps describe in Fig.1.

Internet, intranet, extranet, satellites, audio/video equipment and CDs are most popular electronics media make the access to study very easy [12]. The computer and information technology has contributed in an e-learning system in a variety of ways. Developments and advances in the information technologies give the opportunity to design advanced technologies for e-learning. In e-learning system the delivery of information is web-base. Designing any e-learning technology is a time consuming process. The discussion about existing e-learning technologies can help to develop an effective e-learning system [14].

E-learning is a way of delivering instruction through computer and learning. Various terms such as computer based training, online learning and virtual learning and web based learning are used as synonymous. There are various eras of e-

learning such as e-learning 1.0, e-learning 2.0 and e-learning 3.0.

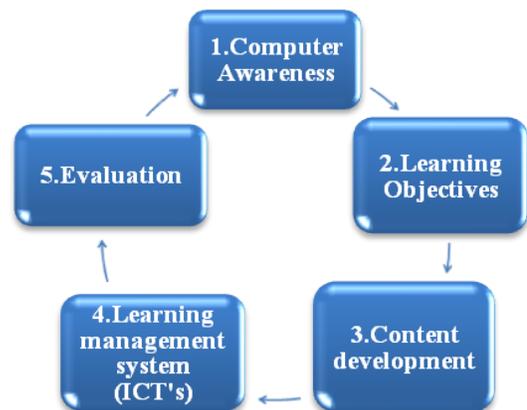


Fig.1 E-Learning Process

In e-learning 1.0 web 1.0 was used and a number of management systems were developed to organize courses and support management. In the era of e-learning 2.0 web 2.0 technologies were introduced for teaching and learning, for example, wikis, blogs, podcasts and other social web tools. In addition, in the era of e-learning 3.0 educations researcher is using various blogs and discussion forums [7]. In the learning style range of digital technologies are used to connect the teachers and students. These tools and technologies are used in e-learning some are used for distance learning and others are used to improve learning and build confidence [14]. ICT infrastructure for e-learning is different from country to country but the internet is obligatory for e-learning and web-based learning. In Europe, learning management systems (LMS) e.g. WebCT, Blackboard and Moodle have become popular among all educational institutions [12].

## II. PURPOSE OF STUDY

As discussed previously ICTs can support the educational process in various ways. The purpose of the study is to compare the variety of technologies that support e-learning in higher education in Pakistan and Sweden. Through this we can understand the difference between the levels of e-learning in the two continents that will help to overcome the weaknesses in the learning environment.

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<sup>1</sup> LMS is learning Management System such as First Class, Black Board and Moodle etc.

### III. RESEARCH QUESTIONS

What kinds of tools are used for e-learning in higher education in Sweden? What kind of tools used for e-learning in higher education of Pakistan? What kind of tool or techniques need to adopt in Pakistan e-learning system as compared to Swedish e-learning system.

### IV. LITERATURE REVIEW

With the development in technologies many new teaching methods are being implemented and considering virtual worlds. Educational institutions have various virtual worlds that is quite innovative and interesting for teaching [1].

In European universities the technologies are used to serve the students from both the distance learning and on-campus blended education such as web, multimedia, e-compedium and podcast. In Norway the e-compedium is the electronic rich media pdf files that cover the topics of lectures that are given on-campus. Moreover it is used for both distance learning students and on-campus students [5]. In Finland, the Finnish Virtual University is a network consortium that support and develop collaboration among universities related to the use of information and communication technologies. Moreover, for effective use of technology in learning and teaching, there is collaboration between Netherland and Dutch. In Dutch, higher education institutions and research institutions concentrate on innovation in information and communication technology (ICT) for technological support of teaching and studying [15].

The innovative use of information and communication technologies has extended in European countries. It is believed that ICT is used to enhanced the education and improve the education practice. ICT is obligatory curriculum in all European countries. Moreover student uses ICT as a tool of communication out of school [6].

#### A. E-Learning in Asia

Knowledge sharing is nourished by the use of ICT and the internet, specifically in e-learning.

The online learning trends are going to increase in Asia. People are positively adapting to get degrees through online learning. The e-learning in Malaysia is providing Open and Distance Learning (ODL) programs, which are conducted by many public and private higher education institutions. The government is trying to overcome the issues like lack of internet speed, peoples' awareness, content material and computer awareness [11]. In addition, a survey was done to get an overview about the trends of e-Learning in Asia. It was conducted to find out the status of e-Learning in regards IT promotions from 12 Asian countries in table 1 and found that China in the future could become a world largest internet user and so the implementation of e-Learning. Moreover it was concluded that most of the e-Learning is used to get higher education and vocational education in Asian countries. Singapore is promoted the e-Learning widely.

The data from survey 2002 was conducted in Asia, by using that the summary is created in a form of a table. All countries are providing online learning in higher education using

synchronous and asynchronous technologies. The e-learning course content is provided in English language [13].

The table I shows the 12 Asian countries to find the trends of e-Learning. This paper shows e-Learning in Pakistan as an Asian country with comparison to Sweden a European country.

TABLE I  
USE OF ICT IN ASIAN PACIFIC COUNTRIES [13]

Sr#	Country	ICTs
01	Singapore	Multimedia
02	Republic of Korea	LMS
03	China	Multimedia and Satellite technologies
04	Malaysia	Course Online (Multimedia learning system)
05	Thailand	Multimedia, satellite and TV broadcasting
06	Philippines	CBT or multimedia with Compact drive and WBT
07	Indonesia	No promotions
08	Vietnam	Limited but provide in digital training materials using LAN
09	Myanmar	Limited 500kbps lines
10	Laos	No information through e-Learning
11	Cambodia	No information through e-Learning
12	Brunei	Tx Lectures

#### A. E-learning in Sweden

In Sweden, there is enhancement in e-learning by using virtual education that is development in traditional class room. This Avatar<sup>2</sup>-based learning is also known as Second life. Thus there is the avatar-based interaction in which students can see themselves in avatar and can feel themselves in virtual environment [1]. The virtual world is defined as simulation in which avatars, that are form of virtual world environment, can move and interacts with each other through integrated text, video and chat tools [4].

In Avatar based virtual world there are some benefits and also some drawbacks. They investigated that students in Linnaeus university, Sweden who take the course with virtual world faced some problems such as with computer graphics, bandwidth. There are lots of difficulties with conducting the course with Second life. It is always difficult for students to install the Second Life program on other persons or general computers when they were not able to use their personal computers [1].

The focus of European commission is on encouraging cooperation and networking on a European level. Therefore high priorities are given to digital literacy, European virtual campuses and e-twinning of schools in Europe. E-learning is known as dual learning in Sweden. There is range of information and communication technologies are used to serve lifelong learning. In addition, multimedia technologies and internet can improve the quality of e-learning [15]. The researcher visited the Sweden university-Linnaeus university to investigate the ICTs used for web-based learning. A popular source of communication between student and teachers are a blackboard and Moodle. Both tools are used for

<sup>2</sup> Avatars are not real body of students but the students

important announcements, discussion and accessing course material and lectures and submission of tasks. In the classroom, video conferencing facility is available for distance learning. In Sweden, teachers and students communicate through chat, e-mail and computer conference. Learning management system (LMS) e.g. WebCT is used in an online setting and liberate student and teacher from being in a specific place. LMS is mostly used for record keeping, collaboration between students, sourcing of course work, submission of tasks [9].

### B. E-Learning in Pakistan

In Pakistan, e-Learning is promoting but with lots of issues and challenges. The government is trying to resolve these issues. There are many public and private institutions providing e-Learning, wider spread is Virtual COMSATS University Virtual Campus and Virtual University of Pakistan (VUP) both are providing synchronous and asynchronous learning techniques. The VUP is using ICT as multimedia/ graphic software's, online teacher or trainer, video conferencing and cellular phones [10]. The Virtual COMSATS University Virtual Campus is one of the growing institutions in e-Learning, providing higher education all around the Pakistan through its study centers. Study centers are providing educational help, computer, internet facility and study material. LMS and satellite technology are used as ICT tools. The LMS includes Video lectures, handouts, course content, eBooks, live sessions, MDBs, GDBs, assignments, quizzes, lab sessions, SMS service and email service. Students are also facilitated by cellular phones and video conferencing. As a developing country there are some issues in e-learning.

- Lack of computer awareness
- Low broadband speed
- Concept of less worth of degree through e-Learning
- Few content materials
- Hard to access digital libraries
- Load shedding of electricity

## V. RESEARCH STRATEGY AND METHOD

The strategy that I have chosen for my research is a qualitative and interpretative study. In a qualitative research the researchers make an understanding of what s/he observes and understands. In a qualitative research the researchers focus on the meaning that participants build [3]. In the research the qualitative research method helps to understand how ICTs are used in Sweden and Pakistan that will help further in analysis and discussion.

### A. Methodology

A theoretical framework social constructivism approach is used. Social constructivism is qualitative approach and also deals with meanings and reality is constructed socially. It is the relationship between society and technology [8]. A social constructivism approach helps to identify additive solutions and to stabilize new technologies. There are different approaches in social constructivism perspective such as mild social constructivism, strong social constructivism and actor network theory [2]. Our focus of the research is technological

innovation in Pakistan therefore mild social constructivism approach will use.

### B. Data collection

Data was collected through observations, interviews, previous researches and documents. Use of ICT and technology support in education and learning institution are different from country to country. Therefore, one European country, Sweden and one Asian country, Pakistan is chosen for exemplary good and innovative practice in using ICT.

### C. Interviews

The recruitment of the informants was carried out in the following way. Some participants were contacted through the Linnaeus University Sweden and other from COMSATS University Virtual Campus Pakistan. The interviews were conducted face-to-face or on Skype in the participants' preferred setting.

### D. Documents

Documents can be used to examine the social phenomenon in focus. Qualitative research books, documents, newspaper articles can be used to understand and explain social phenomenon. In our research we have used documents such as journal article that had information related to ICT in the learning system [3]. Moreover we visited the universities' websites for more understanding their course management system.

### E. Ethical issues

The ethical aspects such as a written permission from participants, confidentiality, saving participants' time has also been considered. We considered how to increase the participants' situation during participation. Therefore, for more ease of participants we, as the researchers focus on stress-free question was created.

## VI. ANALYSIS

The research was conducted in Linnaeus University Växjö, Sweden and COMSATS University Virtual Campus Pakistan. The student of the universities explains what kind of information and communication technologies they used for e-learning and web based education.

### A. ICTs for E-learning

The participants of the research explained that there are various tool and technologies used for communication and web based learning. The discussion is divided into subsections. First we will explain the ICTs in Sweden and then we will discuss the e-learning technologies in Pakistan.

### B. ICTs for E-learning in Sweden

Students are well aware of ICT, they use for e-learning. At the time of interview students expressed that they are satisfied with E-learning technologies. Students explained that LMS is used in the university through this teacher and student communicates. The teacher shares course material relevant to the course work. Moreover, there is a discussion board facility available on blackboard where student of the same course

work can discuss their ideas and upload their assignments. The LMS platform, Blackboard and Moodle are also used for important announcements for students and inform them about assignment deadlines and upcoming tasks related to the course. One of the research participant students who study in marketing department explain about ICTs in following way. *"We use a number of ICT tools for communication between student and teachers. Most of the undergraduate students use Moodle and graduate student are used Blackboard and Moodle also."*

The University provides on-campus education but students can take the courses from a distance also. It varies from each department that for which courses they allow distance learning. Another participant said that *"Internet facility is available for university student all the time. We have a platform that is known as a blackboard. Through blackboard we can email to our teacher and also communicate with other student. Moreover we get important announcements from our teacher related to course schedules and assignments."*

A student of computer department also explains about multimedia that is used in most of the classes' on-campus. Further, s/he said *"Distance students in her/his class use adobe connect for the videos."*

The student commented on the adobe connect that sometime there is a problem of connection some time, s/he further explained *"In adobe connect voice quality have a problem. The distance student face problem in listening lectures."*

All students have an individual university e-mail address and that is linked to Blackboard and Moodle also. Teachers only use the given e-mail address to communicate with students. Most of the students express that they are satisfied with the technology that is used for communication. However some student mentions the adobe connects that is used for distance student some time cannot connect and voice quality need to improve.

### C. ICTs for E-learning in Pakistan

The ICT related questions are interviewed to the students of COMSATS university virtual campus; they are quite satisfied with the e-Learning facilities provided by the institution. They are well awarded of announcements made by LMS and admire the facilities provided by LMS. An interviewed student said *"It is a good idea that technologies are being used for in education. It may provide teamwork environments and student will be able to collaborate and approach each other easily"*

Further, the students explain that the main issue is electricity failure and low internet access. One student of computer science department explained *"The internet speed is too slow to take a lecture within a limited time of electricity."*

A student of management science pointed out another issue related to e-learning, s/he said *"The course contents are so difficult in such environment where s/he could not get eBook or any other alternative material."*

The student showed their comfort ability to interact with LMS and they explained that it is user friendly. Only one out of 15 students showed that s/he found difficulties to interact with graded and moderated discussion boards. During the interview it is observed that students are very interested to get education through internet but complaining about internet

speed. Moreover, the main reason behind getting a higher education degree to get a promotion/high grades in jobs or some of the students who find a university at a distance.

A female student of the Masters in English expressed that *"I find LMS difficult when a subject needs narrative writing practice and proper guidance in this regard."*

The question about the multimedia technology and adobe connects to video; students of COMSATS University Virtual campus are unaware. Multimedia and adobe connect are not used for distance learning students in Pakistan. Students explained that unavailability of multimedia and adobe connect technologies are hurdle in efficient communication. *"We cannot see and understand the presented material that teacher delivers. Because of it we cannot understand the topics exactly. There is need of multimedia and adobe connects to overcome the problems of distance learning students."*

## VII. DISCUSSION

The aim of this research is to explore information and communication technologies (ICTs) used by the students for e-learning in higher education. Further to get the understanding between the learning system of Sweden and Pakistan. Moreover highlights the issues of e-learning that students are facing. In social constructivism is the active and constructive process of learning. In this construction process people build their own meanings through interacting with each other [8]. The facility of e-learning is popular in the group of people who cannot visit the campus for attending lectures because of their daily routine or work activities. However they want to get any higher degree for up gradation in their current job and extending their previous knowledge. E-learning provides them a platform where they can manage both things together. They can study and also can continue their job.

A learning that is facilitated and supported through the use of information and communication technologies is called e-learning. In the e-learning learning is delivered entirely online. In the universities where the research is conducted students use several ICTs in their learning and education system. These technologies are used for collaboration, communication, teamwork and independence in learning. We asked the same questions from the students of both universities. During the discussion the students' attitude about the use of the technology and e-learning was positive. Especially, Swedish university students expressed that they are highly satisfied with the current ICTs. Our findings are consistent with [15] who states that there are several information and communication technologies used for e-learning in Sweden that is known as dual learning. This involvement in ICTs learning has become lifelong learning. In addition, students can communicate with other students or teachers through chat, e-mail and computer conference [9]. During discourse students explained that e-learning tools has decreased that distance between teacher and students. It has become more convenient for students who cannot attend the class in-campus. There are several e-learning tools used in the areas, Sweden and Pakistan, where this research was conducted such as LMS (learning management system), multimedia, internet and adobe connect for video. These are famous e-learning tools through which students can

easily communicate with their teachers. Especially, LMS helps the students to get announcements of upcoming events and assignment deadlines.

Swedish university- Linnaeus university- students explained that they use various ICT for communication and collaboration during their studies. They further explained that LMS-Black Board and Moodle- are well-used platform for course management. They are satisfied with the use of blackboard for the use of communication and sharing connects. The students explained that they mostly use LMS for course announcements, discussion and emailing. Learning management system (LMS) e.g. WebCT is used in an online setting and liberate student and teacher from being in a specific place. LMS is mostly used for record keeping, collaboration between students, sourcing of course work, submission of tasks. In Sweden learning management system (LMS) has made the e-learning and distance learning more convenient. Students can easily access the course material and information about the course schedule. The findings are consistent with previous research. The researcher visited the Sweden university-Linnaeus university to investigate the ICTs used for web-based learning. A popular source of communication between student and teachers are a blackboard and Moodle.

The same questions about the use of ICTs in their learning environment are asked to Pakistani students they explained that they use LMS. Most interviewed students of COMSATS University virtual campus said that the system is used for important announcements, discussion and accessing course material and lectures and submission of tasks. The students of the COMSATS University virtual campus said that LMS is very comfortable and user friendly system. They expressed that ICTs are more convenient for students with distance learning. However some students were not satisfied discussion board that is a tool of LMS. A student explained that some time they encounter difficulties in interaction through discussion boards. There are some improvements required for better communication between students and teachers.

We, as researchers, discuss about the internet with the participated students. It is identified from the point of view of the participated students; they think that the internet is main technology that is used for communication. The internet is the technology that has decreased the distances and playing an efficient role in distance learning [15]. When the question was asked related to access the internet there was a contradiction between the experience of Swedish and Pakistani students. The Swedish university provides the facility of internet with efficient speed. Therefore, students can connect with the university and attend the lecture without any trouble related to internet speed. Most of the participating students were satisfied with the speed limit of internet. On the other hand, however, in Pakistan some hurdles are identified that students of e-learning and distance education are facing. One of the big problems in Pakistan is the issue of downfall of electricity, because of this student have only limited time of using the internet. In addition, a student pointed out the problem of low speed internet. They complained that in this limited time of electricity internet access speed is very slow that become

trouble for students who cannot attend on-campus class and want to take distance course.

In the area where the research was conducted, multimedia technologies are also used. In Linnaeus university Sweden, where the research is conducted, teachers are using multimedia for delivering lectures and presentations. Distance students can also view the presented lectures using adobe connect for video. However, some students explained that sometimes adobe connect does not work and students cannot hear the voice properly. Nevertheless, the students of COMSATS University Virtual Campus university Pakistan expressed that multimedia technology and adobe connect do not use for distance learning students. In interviews some students demand that multimedia and adobe connect should be implemented for to power online education.

## VIII.CONCLUSION

The purpose of my study was to understand the difference between the ICTs tools in Pakistan and Sweden. Further, the researches help to find out the weaknesses in the e-learning system of Pakistan and give suggestion through comparing Swedish e-learning system.

According to the analysis and discussion it is concluded that e-learning use the computer and technologies as vehicles for exchanging knowledge between teachers and students. There are many issues and challenges of e-Learning in Pakistan but these challenges have been taken by the COMSATS university virtual campus team. The institute is trying to facilitate the e-Learning technologies as European countries are providing to their students.LMS resource for finding and using other people's educational materials e.g. those created under the Open Educational Resources. In addition, online learning helps to find the educational material of others for which you have to ensure you seek permission.

However still improvement is needed, the multimedia technology and adobe connect are necessary e-learning tools. There is need that COMSATS university virtual campus uses these technologies for making the distance learning more convenient.

There are following issue in COMSATS university virtual campus that needs improvements:

1. Electricity downfall.
2. With limited internet access.
3. Low Speed Internet.
4. Unavailability of multimedia technology.
5. Unavailability of adobe connects for video lectures.

If COMSATS university virtual campus overcomes these problems then they can compete with universities of developed countries like Sweden. The downfall of electricity is not the individual problem. However, the university can facilitate the students with high speed internet. Moreover multimedia and adobe connect are also essential technologies for better communication between distance students and their teachers. Through multimedia elements help to achieve the learning objectives. Moreover, it can become easy for teaching materials add context on a subject. Further, multimedia provides the collaborating opportunities and online

assessments. Thus multimedia is a rich resource that engages students with teaching.

Through these technologies distance learning student can attend the live lectures. Moreover through ICTs collaborative and team work skill can be developed with students and personal approach of learning can be offered them. The COMSATS university virtual campus should give attention towards these improvements for making the virtual learning system more efficient for students. ICT will help in motivating and engaging learners with each other and ability of independent learning can be introduced.

#### REFERENCES

- [1] Appaneni V, and Likisa Y, "Using Virtual World in Education: The case of Second Life", [www.lnu.se](http://www.lnu.se), Diva, 2011.
- [2] Baird, D, "Social Constructivism for Philosophers of Technology: A Shopper's Guide. Society for Philosophy and Technology", *E-journal*, vol. 2, pp.3-4, 1997, Accessed May 2013.
- [3] W. J. Creswell, "Research Design: Qualitative, Quantitative and Mixed Method Approaches", *SAGE Publications*, London.
- [4] M. D. Dickey, "Brave new (interactive) worlds: a review of the design affordances and constraints of two 3D virtual worlds as interactive learning environments", *Interactive Learning Environments*, vol. 1-2, pp. 121-137, 2005.
- [5] B. Foss, F. B. Oftedal, A. Lokken, "Rich Media E-Compendiums: A New Tool For Enhanced Learning in Higher Education", *European Journal of open, distance and e-learning*, pp. 102-114, 2013.
- [6] U. Fredriksson, G. Jedeskog, T. Plomp, "Innovative use of ICT in schools based on the findings in ELFE project", *EducInfTechnol*, pp. 83-101, 2008.
- [7] F. Hussain, "E-learning 3.0= E-learning 2.0 + web 3.0?", *IADIS International Conference on Cognition and Exploratory in Digital Age*, (2012).
- [8] D. Howcroft, N. Mitev, and M. Wilson, "What We May Learn from the Social Shaping of Approach", In D. Howcroft, & E. M. Trauth, (Eds.) *Handbook of Critical Information Systems Research*. Mass: E. Elgar Publishing, pp. 329-340, 2005.
- [9] J. Jaldemark, "Participation and Genres of Communication in online setting of higher education", *EducInfTechnol*, pp. 129-146, 2008.
- [10] M. Ali, A. Ahmed, A. W. Shaikh, A.H.S. Bukhari (2011). Impacts of Information Technology on E-learning System in Pakistan, *Sindh Univ. Res. Jour. (Sci. Ser.)* Vol.43, pp. 29-34.
- [11] Prof Tan Sri Datuk, Dr Anuwar Ali, "Issues & challenges in implementing E-Learning in Malaysia", 2004, Malaysia.
- [12] V. Sulcic, D. Lesjak, "E-learning and Study Effectiveness, Journal of computer information system", *University of Primorsk, Springer*, 2009.
- [13] "Survey Research on E-Learning in Asian Countries". [Online] Available:<http://www.asialearning.net/content/relatedInfo/report/elearning-trend-2002overview.pdf>, 2002.
- [14] P. M. Uysal, "The Domain for the Multi-Criteria Decisions about E-learning System", *Turkish online Journal of Distance Education-TOJDE*, Vol. 2, pp. 198-112, 2012.
- [15] E. Åström, "E-learning Quality Aspects and Criteria for Evaluation of E-learning in higher education", *Sweden, Swedish National Agency for Higher Education*, Report 2008.