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The ICT Facilities, Skills, Usage, and the Problems Faced by the Students of Higher Education

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ABSTRACT

The present survey research was aimed at identifying the ICT facilities, skills, usage, and the problems faced by the students of higher education while using ICT. The population of the study comprised the students of public sector universities of Lahore, Pakistan. Instrument was developed by the first author. About 250 students were selected from three public universities. Descriptive statistics were used to analyze the data. The findings revealed that the students have computers and Internet facilities at home and universities. They are expert at simple skills like MS Word, MS Power Point, Searching and Browsing at Internet, Social networking, Email, File attachment, and Computer games but are less skilled or poor on other skills like using digital library, discussion forums, and Blogs. Students spend more time on computers for recreational and other purposes than for academic purpose. They believe that the use of ICT supports their learning. Slow speed of computers, signal problem in Internet, virus threat, poor working condition of computers, load shedding, and lack of access of Internet are the problems faced by the majority of the students. The universities should invest more on improving the infrastructure to address the ICT related problems of students at the universities.

Keywords: ICT (Information & Communication Technology), ICT facilities, ICT skills and programs, usage of ICT for learning, higher education

INTRODUCTION

Ultimate power of technology is the information and the communication. ICT is vital for social life, business and economy, to meet the demands of modern information society, and for the progress of education (Aduwa-Ogiegbaen & Iyamu, 2005). Use of ICT in education improves the quality and the quantity of education (Balasubramanian et al., 2009) and causes better innovative, creative and cognitive thinking, higher productivity, efficiency, and educational outcomes (Adeosun, 2010). ICT facilitates both instructional and learning process (Jung, 2005) and has a great influence on teaching and learning at higher education. It provides opportunity for personalized, flexible and asynchronous learning and shifts the learning from teacher centered to student centered and hence is a catalyst for reforms about classroom, educational institute, community and system (Youssef & Dahmani, 2008). It enhances the learning of the students, helps the students to learn new skills set, promotes social mobility, helps the citizens to compete in a worldwide economy, and thus has a multiplier effect across the education system (UNESCO, 2014).

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State of the literature

- Computer and Internet affected the educational process more than the previous educational technologies. Integration of ICT in higher education facilitates both instructional and learning processes. In addition to audio and visual sense, computer and Internet activate the sense of touch of the user as well and provide the opportunity of higher interaction to the users for the development of their individual, creative, and intellectual abilities.
- Advanced forms of ICT assisted instruction including computers and Internet assisted instructions require proper infrastructure including substantial computers and Internet resources. The lack of ICT resources and poor infrastructure prevent the full implementation of ICT in education.
- There are many challenges regarding the integration of ICT particularly in developing countries. ICT in education in Pakistan is a challenge as infrastructure is neglected particularly in its remote areas.

Contribution of this paper to the literature

- Students have computers and Internet facilities at home and universities. They believe that the use of ICT supports their learning. However, they spend more time on computers for recreational and other purposes than for academic purpose.
- Students are expert at simple skills like MS Word, MS Power Point, Searching and Browsing at Internet, Social networking, Email, File attachment, and Computer games but are less skilled or poor on other skills like using digital library, discussion forums, and Blogs.
- Slow speed of computers, signal problem in Internet, virus threat, poor working condition of computers, load shedding, and lack of access of Internet are the problems faced by the majority of the students.

Information Communication Technology (ICT) presents the material through multiple stimuli like sounds, images, and movement thus catering the needs of psychomotor, visual, and affective learners (Haddad & Jurich, 2002). Radio-assisted instruction (RAI), Television-assisted instruction (TAI), Computer-assisted instruction (CAI), Internet-assisted instruction (IAI) are some of the dimensions of ICT-assisted instruction (UNESCO, 2014). Radio and television have been used for educational purpose for a long time. However, computer affected the educational process more than anything else. In addition to audio and visual sense, computer activates the sense of touch of the user as well. It provides the opportunity of higher interaction to the users for the development of their individual, creative, and intellectual abilities. Radio and television are now considered comparatively traditional technologies in education system as students remain passive learners while using these. Computers, however, provide more productive and innovative instruction and learning to enhance the intellectual and creative potentials of the students in today's information society (Aduwa-Ogiegbaen & Iyamu, 2005). Therefore, computer has been integrated in teaching faster than the previous audio visual technologies (Balasubramanian et al., 2009). Computers and Internet offer excellent and plenty opportunities to the students through the use of text, graphics, multicolor images, motion, and audio for the development of their creative talents and high quality learning. Computer offers more learner centered instruction, independent investigation, personalized activities, and teamwork. It offers a variety of contents and symbolic modes to the learner and acts as a partner and tutor who interacts with a learner thus offering opportunity for individualized learning to the students. Internet is playing the major role in the dissemination of information and knowledge in this global village (Aduwa-Ogiegbaen & Iyamu, 2005).

Study from Nigeria showed that the lack of ICT resources and poor infrastructure prevent the full implementation of ICT in education (Adeosun, 2010). Advanced forms of ICT assisted instruction including computers and Internet assisted instructions require proper infrastructure including substantial computers and Internet resources. Computers available to educational institute contain computers both for instructional and administrative purposes. In developing countries, fewer computers are available for instructional purposes. The term Learner Computer Ratio (LCR) is used to describe the number of learners using a computer for instructional purpose in an educational system. Developed and developing countries deploy computers differently in their educational institutes. Developing countries establish computer labs, whereas developed countries diversely

distribute the computers in the educational institute (UNESCO, 2014). Proper infrastructure also includes electricity that is necessary for using the computers (Aduwa-Ogiegbaen & Iyamu, 2005). The majority of ICT resources including computers and Internet require stable energy resources to support ICT in education. Lastly, telecommunication facilities are included in the required infrastructure. A communication technology may be a narrowband or broadband fixed telephone line or a cable connection that connects a terminal equipment to the telephone, or other telecommunication network (UNESCO, 2014).

Money spent on youth is best for long term investment and offers the highest rate of return (ROI) for the future of a nation (HEC, Pakistan, 2016). Higher education institutions have been spending large amounts in ICTs for the past two decades (Youssef & Dahmani, 2008) as integration of ICT in higher education adds the value of the higher education institutes for the social and economic development (Balasubramanian et al., 2009). Many Asian countries include course or objectives on computing or basic computer skills at primary, lower secondary, and upper secondary levels of education because basic computer skills or computing are important for lifelong learning (UNESCO, 2014).

Integration of ICT in education is still in its initial stages (Balasubramanian et al., 2009). There are many challenges regarding the integration of ICT particularly in developing countries, where high opportunity costs are involved in establishing institution wide ICT systems compared to developed countries. The main problems are high cost of getting, installing, operating, maintaining, and replacing ICT systems, use of unlicensed software, outdated hardware and software systems, lack of technical support for maintenance of systems (Balasubramanian et al., 2009). ICT in education in Pakistan is a challenge as infrastructure is neglected particularly in its remote areas (UNESCO, 2014).

RESEARCH QUESTIONS

The current study was aimed at assessing the facilities, skills, usage, and problems regarding the computer and Internet among the students of higher education. Following were the research questions of the study:

1. To what extent ICT facilities are available to the students of higher education at home and university?
2. To what extent students have expertise on ICT skills and programs?
3. To what extent ICT facilities are in use of the students of higher education for academic purpose?
4. What are the problems faced by the students of higher education while using ICT resources?

RESEARCH METHODOLOGY

The present study was a survey research of descriptive research design. The population of the study was the students of higher education of district Lahore. A sample of 250 students was selected from the three universities of Lahore, the provincial capital of the province Punjab of Pakistan. The participants belonged to the departments of computer sciences (26.8%), mathematics (4.8), statistics (2.8), natural sciences (20.4%), and arts (45.2%). Majority of the students (83.2%) were from BS/MA, whereas others were from BA/BSc (5.2%), MS/MPhil (6.8%), and PhD (1.2%). Majority of the participants (94%) were female whereas males were only 6%. Age range of participants were between 17 to 27 years, out of which about 86.8% participants were in the age range 18-22 years.

A scale developed by the first author was used as a tool of study. Both open and close ended questions were used in it. Some parts of the scale comprised checklists on which the students were required to respond in yes or no. Other parts included items on 5 and 6 point likert type scale. Open ended questions were included in the study to obtain more insight regarding the research questions. The data were analyzed using descriptive statistics including frequencies, percentage, mean score, and standard deviation.

RESULTS

Access to ICT facilities for the students of higher education.

Students were provided with a checklist of ICT facilities available to them at their homes and at the university and they were required to respond in yes or no. Results about the access of ICT facilities are summarized in **Table 1**.

Table 1. Availability of ICT resources among participants at home and at university

Facility	At home		At university	
	f	%	f	%
Computer	197	78.8	192	76.8
Laptop	216	86.4	71	28.4
Internet	217	86.8	206	82.4
Printer	66	26.4	189	75.6
Scanner	42	16.8	161	64.4

Table 1 shows that the majority of participants have computer and Internet at homes and university. Majority of the students (86.4%) have laptops at their homes. However, printers and scanners are not available to the students at their homes, rather they can use this facility at the university.

ICT skills among the students of higher education

Students were provided with a list of computer skills and programs so that they can show the level of expertise on these on 5 point likert type scale. Results are presented in the **Table 2**.

Table 2. Participants' level of expertise at different programs

No	Program	M	SD
1	MS Word	3.68	1.22
2	MS Excel	2.97	1.32
3	SPSS	2.08	1.30
4	MS Power Point	3.58	1.31
5	Photoshop	2.49	1.42
6	MS Access	2.06	1.27
7	Searching/Browsing at Internet	4.15	1.17
8	Using digital library	2.61	1.43
9	Email	4.22	1.15
10	File attachment	3.97	1.33
11	Discussion forums/ Blogs	2.34	1.41
12	Computer games	3.88	1.36
13	Social networking	4.29	1.10
14	Windows & file management	2.90	1.45

Table 2 shows that the participants are good at some educational and recreational ICT related skills and programs like MS Word, MS Power Point, Searching and Browsing at Internet, Email, File attachment, Social networking, and Computer games. Results showed that students have moderate level of skill at using MS Excel, Windows & file management, and using digital library and are poor at using programs like Photoshop, discussion forums and Blogs, and SPSS.

Responses on open ended question showed that about 38.3% students know the use of C++ program, about 29.6% know C language, about 16.0% know MATLAB, about 14.8% participants know Java, and about 1.23% participant know the use of SEO program.

Use of ICT for academic purpose

In the present study, students were asked how much time they spend on computer and Internet for academic, recreational, and other purposes. **Table 3** presents the results regarding the usage of computer and Internet for various purposes.

Table 3. Participants' usage of computer and Internet per week

Time (hrs./week)	Academic		Recreational		Others		Total	
	f	%	f	%	f	%	f	%
0-5	147	58.8	93	37.2	87	34.8	49	19.6
6-10	61	24.4	53	21.2	43	17.2	41	16.4
11-15	15	6.0	32	12.8	32	12.8	63	25.2
16-20	12	4.8	9	3.6	11	4.4	39	15.6
21-25	3	1.2	3	1.2	4	1.6	19	7.6
More than 25	4	1.6	5	2.0	9	3.6	39	15.6
Total	242	96.8	195	78	186	74.4	250	100

Table 3 shows that the majority of the participants use computers for academic purpose for 0-5 hours a week (58.8%). For recreational and other purposes, the use of computers is comparatively more and almost the same percentage of participants (58.4% and 52% for recreational and other purposes respectively) use computers for 0-10 hours. About 24.4% participants use computer for 6-10 hours per week for academic purpose. Only about 13.6% of the participants use computer for academic purpose for more than 10 hours per week. On the other hand, for recreational purpose about 19.6% participants and for other purposes about 22.4% participants use computer for more than 10 hours.

Participants were provided with a checklist of four possible sources which contributed towards their computer learning. Participants were required to respond in yes or no to each of these sources. Frequencies and percentages of these sources are presented in **Table 4**.

Table 4. Computer learning among the participants

Statements	f	%
Family member	121	48.4
Peer/ friend	80	32.0
Studied some course in degree program	134	53.6
Have taken certification course in computer	43	17.2

Table 4 shows that the majority of the students (53.6%) have studied some course related to computer in their degree program. Moreover, the help of a family member (48.4%), peers/friends (32%), and attending a certification course in computer (17.2%) also contributed towards their learning of computer.

Students were provided with three statements to identify the extent to which they experience the use of ICT for teaching and learning. They were asked to respond on statements on 6 point likert type scale. The results are summarized in **Table 5**.

Table 5. Usage of ICT resources in students' teaching and learning

No	Statements	M	SD
1	Our university courses require us to make use of computer and Internet	5.03	1.41
2	Our teacher use computer/Internet/multimedia in teaching	4.49	1.70
3	Computer/Internet helps you in learning	5.29	1.20

Table 5 shows that the students agreed that their university courses require them to use the computer and Internet and it helps them in learning. However, their teachers sometimes use computer/Internet/multimedia in teaching. In open ended question, students were asked to share anything they want to mention regarding their teaching and learning and information technology. In this regard, about 8.8% students told that ICT plays a very

important role in their teaching and learning. About 4% participants expressed that they can get information about anything with the help of Internet and about 7.2% suggested that universities should provide training about the use of ICT to their teachers and students.

Problems faced by the students while using ICT

Students were provided with a checklist of problems they face at home and at university. Results are presented in **Table 6**.

Table 6. Problems of students while using computer/Internet

No	Problem	At home		At university	
		f	%	f	%
1	Poor working condition of computers	41	16.4	182	72.8
2	Lack of access of Internet	63	25.2	157	62.8
3	Non availability of the require software	116	46.4	123	49.2
4	Lack of technical support	63	25.2	118	47.2
5	Virus threat	115	46.0	185	74.0
6	Slow speed of computers	72	28.8	209	83.6
7	Signal problem in Internet	103	41.2	191	76.4
8	Load shedding	181	72.4	176	70.4

Table 6 shows that the most important problem participants reported regarding the use of ICT at home is load shedding (72.4%). About 70.4% of the participants face this problem at university as well. Second important problem faced by the students at home is the non-availability of the require software (46.4%). About 49.2% participants face this problem at university. Other problems participants face at home are virus threat (46), signal problem in Internet (41.2), slow speed of computers (28.8), lack of access of Internet (25.2), lack of technical support (25.2), and poor working condition of computers (16.4). At university, students face the problems of slow speed of computers (83.6%), signal problem in Internet (76.4), virus threat (74.0), poor working condition of computers (72.8), lack of access of Internet (62.8), and lack of technical support (47.2). In open ended question, about 19.6% participants responded and the two problems reported by participants were window corrupt (12.8%) and occasional held of computer (6.8%).

DISCUSSION AND CONCLUSION

Substantial computers and Internet resources are required for adequate exposure to Computer Assisted Instruction (CAI). If sufficient numbers of computers are available, each learner may have access to computer for more time (UNESCO, 2014). On the basis of results, it is concluded that majority of the students have computers and Internet facility at their homes and university. However, they can use the facility of printer and scanner at the university rather than at home. Majority of the students possess laptops as provincial government of the Punjab and the Federal Government of Pakistan distributed free laptops to the talented students during last few years. Government of the Punjab planned to distribute one lac free laptops among the students of public sector higher education institutions of the province, who got 60% or above marks in last exam in case of annual examination system or 70% or above in case of semester system so that these students can excel in the field of knowledge (Government of Punjab, 2011). About 310000 laptops were distributed among the students during first 3 phases and the registration for the fourth phase was started in April 2017 during which another 115, 000 laptops were planned to be distributed to the talented students (Studysols, 2017). Government of Pakistan initiated free laptop distribution scheme in 2013. The aim of the scheme was to distribute one lac laptops among talented students of public sector higher education institutions of Pakistan to increase access to ICT, to enhance the quality of education, and to promote research. Another one lac laptops were distributed among the eligible students under Phase II of the scheme in 2015. Phase III was planned in 2016. Phase II and III covered other ICT components besides laptops, like genuine software, technical support system, access for Internet, and HEC digital library (HEC, Pakistan, 2016). The distribution of free laptops under the provincial and federal governments among talented students of public

sector higher education institutions is a much-appreciated initiative particularly in a developing country which faces the challenges of limited access to ICT resources and poor infrastructure.

Students were skilled at simple programs like MS Word, MS Power Point, Searching and Browsing at Internet, Social networking, Email, File attachment, and Computer games. However, they are less skilled at using MS Excel, Windows & file management, and using digital library and are poor at using programs like Photoshop, discussion forums and Blogs, and SPSS.

Internet may be used for different purposes like study assignments, seeking information for further studies, making friends, recreational activities, and shopping (Chan & Fang (2007). Hawi (2012) found that students use the Internet for communication, research, and entertainment. Ayub, Hamid, and Nawawi (2014) reported that the students of higher education in Malaysia use Internet for 4.48 hours a day. Results of the present study showed that students spend more time on computers for recreational and other purposes rather than the academic purpose. Majority of the students learned the computer through a course that was offered to them during their degree program. They believe that the use of ICT supports their learning.

The most important problem students reported regarding the use of ICT at home was the load shedding. About more than two third of the participants faced this problem both at the home and at the university. Pakistan faces tremendous amount of problem of load shedding. Production of electricity in Pakistan is 12000 MW whereas its demand is 19000 MW (Dunya News, 2014, Jul 15), which results in severe shortage of electricity across the country (Qasim, 2016, May 12). According to official statement, urban areas have schedule for about six hours and rural areas for about eight hours of load shedding across the country (Kiani, 2016, April 20). However, practically urban areas have faced as high as 12-14 hours and rural areas from 18 to 20 hours of electricity shortfall during extremely hot summer (Dunya News, 2014, Jul 15). It is difficult to implement ICT in education if power supply is disturbed in national infrastructure (UNESCO, 2014). Fluctuation in electricity causes damage to expensive ICT resources. Stable and constant electricity supply is necessary for the proper functioning of computers and other high-tech equipment especially under extreme weather conditions (Aduwa-Ogiegbaen & Iyamu, 2005). Distribution of free laptops under provincial and federal governments among the students of higher education is a valuable initiative keeping in view the long hours of electricity shortfall across the country.

Second important problem faced by the participants at home was the non-availability of the require software. According to Salomon (1989), supply of relevant and appropriate software is a major hindrance for expansion of computer use in many countries. Other problems participants faced at home were virus threat, signal problem in Internet, slow speed of computers, lack of access of Internet, lack of technical support, and poor working condition of computers. Students face more problems regarding the use of ICT at university than at home. At the university, slow speed of computers, signal problem in Internet, virus threat, poor working condition of computers, and load shedding were the problems that were faced by more than two third of the students whereas the lack of access of Internet, non-availability of the require software, and lack of technical support were the problems that were faced by nearly half or more students. Window corrupt and occasional held of computer were the two problems that were reported by the students in open ended question. Aduwa-Ogiegbaen and Iyamu (2005) identified lack of stable electricity, lack of relevant software, limited access to the Internet, inadequate telecommunication facilities, lack of human skills and knowledge, weak infrastructure, and lack of cost effective and reliable Internet connectivity as technological challenges in Nigeria.

Government and universities should invest more on improving the ICT infrastructure to address the ICT related problems of students at the university. Moreover, students should be introduced some important ICT skills in their computer course of the degree program that can help them in their study like MS Excel, Windows & file management, use of digital library, Photoshop, discussion forums and Blogs, and SPSS. The ICT should be firmly embedded into the teaching and learning so that the teaching and learning process may be improved with the help of the modern technology.

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