

## Nature and Extent of ICT Usage in Educational Institutes: An Empirical Study

*Dr. Anu Sahi \**

### Abstract

*The objective of this paper was to examine the faculty preferences towards various ICT tools in educational institutes of Northern India comprising majorly the state of Punjab. It specifically aimed to explore the nature and extent of usage of ICT along with factors influencing the usage of ICT among teachers and measuring the impact of usage of ICT on teaching. Primary data had been collected from two hundred teachers of Punjab through the use of a well-structured questionnaire. Data collected had been analyzed through percentages and cross tabulation, ANOVA, and independent sample t- test and Factor analysis has also been used meticulously. The results of the study indicated that teachers in the study found to be fairly using ICT. Teachers have been quite comfortable with usage of computers and their major preferences for ICT tools include multimedia computers, projectors, and MS-office. The teachers surveyed were majorly using ICT for administrative purposes or for preparation of resource materials. Though majority teachers were comfortable with usage of various software's and other ICT tools, yet all of them agree to one thing, that ICT helped them to reduce workload only in terms of administrative work, but has not proved to be rewarding in academic tasks and related rewards like salary increase or promotion. This puts a question mark on the usage of ICT as, if processes have been made easier with ICT, the resulting productivity should be rewarded.*

**Key Words:** *ICT, Educational Institutes, Computers, Softwares, Northern India, Punjab.*

### Introduction

Information and Communication Technologies (ICT) have taken a centre stage in all sectors of the economy and education is no exception. Initially ICT issues quickly moved from instituting special programs for preparing individuals to become ICT

specialists in schools and then to infusing ICT into all aspects of an educator's preparation. According to Zlamanski & Ciccarella (2012) ... .. "Information and Communication Technology (ICT) refers to equipment which produces, stores, and

*\* Assistant Professor, Management Studies, Apeejay Institute of Management Technical Campus, Jalandhar*

communicates information. Electronic ICT, such as computers and mobile phones has rapidly increased in availability over the last two decades and children have embraced this media.” According to Afshari, Bakar, Luan, Samah & Fooi (2009)..... “The use of information and communication technology (ICT) creates a powerful learning environment and it transforms the learning and teaching process in which students deal with knowledge in an active, self directed and constructive way” (Volman & Vaneck, 2001). ICT is not just regarded as a tool, which can be added to or used as a replacement of existing teaching methods. ICT is seen as an important instrument to support new ways of teaching and learning. It should be used to develop student's skills for cooperation, communication, problem solving and lifelong learning (Plomp et al., 1996; Voogt, 2003). According to Jager and Lokman (1999) ..... “ICT can be viewed as an object, as an assisting tool for making assignments, collecting data and documentation, communicating and conducting research. Further, ICT as a medium for teaching and learning through which teachers can teach and learners can learn. It appears in many different forms, such as drill and practice exercises, in simulations and educational networks. In India, The Ministry of National Education (MNE) has taken seriously the issue of usage of ICT in education field and has also made huge investments in educational softwares and technologies with the aim of improving the quality of education. Integrating ICT training into all levels of primary education and providing each student with access to ICT equipment and information sources were also among the goals of the MNE. ICT classrooms are equipped with computers, printers, instructional software, electronic references, video players, overhead projectors and

television. Nevertheless, the claims for usage of ICT in education for improved learning or higher order thinking needs to be explored in depth.

## **Literature Review**

### **2.1 Frequency and Purpose of ICT Tools**

According to Gujjar, Naeemullah & Tabassum (2013)..... “Computer is taking up a significant place in our social and professional lives and is prevailing over ever more aspects of our life. It has overcome many activities of our leisure time too. At present, professional and private achievements have become associated with computer skills and successful interaction with computers. Therefore, to advance in a computer based society it is essential to let male and female students have impartial and unprejudiced practice with the equipment right from their childhood. In an educational setup, more often than not, a tutor can play an instrumental role in putting computer into practice provided that a tutor has a wonderful capability to impart ethics and values to students. It becomes essential to identify with the prejudices and labels that professors may hang on to about the making use of computers. According to Sadaf, Newby & Etmer (2012)..... “Web 2.0 technologies (wikis, blogs, social networking, etc.) are becoming increasingly prominent in education, because of the need for students to develop 21st century skills as well as the potential value of these technologies for teaching and learning. These social interfaces of Web 2.0 technologies provide new ways for people to collaborate, interact, communicate, co-create, and share ideas and knowledge (Hartshorne & Ajjan, 2009; Shihab, 2008). As per Olulube, (2006)..... “Many Nigerian teachers have been unable to find effective ways to use technology in their classrooms or

any other aspect of their teaching and learning life. The possible explanation for this lack of success by teachers is that the use of technology in the classroom has not been encouraging and teachers are not well trained in using ICTs in teaching as a means for educational sustainability". Higher educational institutes are implementing ICT technology, particularly mobile technology like laptops, tablet computers and notebooks etc and students of higher education welcome these technologies aggressively and very much receptive to them (Waldeck & Dougherty, 2011). Number of organizations has conducted national surveys on the usage and impact of the propagation of technology in different forms in schools and higher education" (Pearson Foundation, 2012; ECAR Study of Undergraduate Students and Information Technology, 2012; NMC Horizon Report, 2013)

## 2.2 Factors Influencing Use of ICT among Teachers

The debate on use of ICT in education has been for long as education field is considered to be different from other sectors, having different impact of ICT on students and teachers, as teachers are actually involved in nation building. So, the question of using Information and Communication Technology (ICT) in teaching requires deep deliberations. Research conducted over the years have identified that there are number of factors that act as motivators as well as factors that act as inhibitors to use ICT among teachers. Some of the factors identified which influences teachers' decision to use ICT in classroom are access to resources, quality of software and hardware, ease of use, incentives to change, support and collegiality in their school, school and national polices, commitment to

professional learning and background in formal computer training (Mumtaz, 2006). The review highlights the role of pedagogy and suggests that teachers' beliefs about teaching and learning with ICT are central to integration. It is suggested that successful implementation of ICT needs to address three interlocking frameworks for change: the teacher, the school and policy makers. According to Osibanjo & Damagum (2011)..... "The officers' inabilities to adopt ICT in Nigerian public sector are poor state of infrastructure, lack of technical know-how and non-availability of latest technology which hinders the use of ICT in performing managerial functions."

The usage of ICT can help improving teachers as well as students. The improved outcomes in students can be higher motivation, information handling and improved outcomes in teachers can be ICT skills, pedagogical skills, and self confidence. Hence the use of ICT can be phenomenal in education field (Pelgrum, 2002). The positive factors affecting perceived ease of use of ICT can be categorized as ownership of computer by the faculty, usage of computer outside the classrooms, confidence in using ICT, while negative factors which can affect use of ICT have been identified as difficulty in using software and hardware, no technical support, too expensive to use regularly (Cox, Preston & Cox 1999). According to Usluel, K, Askar, B. & Bas, T (2008)..... "Identified the factors which are likely to affect teachers' decisions on making use of electronic technologies throughout the teaching process and found out that the personal motivation is an important factor which forces faculty members to improve their teaching methods and contribute to the learning of students by technological means" (Medlin, 2001).

### 2.3 Impact of ICT on Teaching

According to Champan, and Mahlack (2004)..... “The rapid spread of electronic communications has the capacity to affect the quality and efficiency of basic education throughout the world in dramatic ways – both positively and negatively. The ease with which teachers and students can gather information over the Internet on virtually any topic has the potential to transform instructional content and pedagogical practice”. According to Ali, Haloader and Muhammad (2013)..... “The impact of ICT on teaching and learning can be measured through new method of learning called E-learning (Electronic learning) where students study while they are at home or work place without going to the school. This makes many workers or employees to enroll and upgrade themselves easily. It has also made communication easy through the internet e.g. E-mail, chatting, Skype, teleconferencing, video conferencing, etc.”

#### Need and Scope of the Study

Education sector has its many challenges and use of ICT in education has been added as a new one. The impact of ICT on sectors like manufacturing, telecommunication has been unparalleled, while, its impact and usefulness has yet to be tested in educational sector. Majority of the studies conducted on ICT in education sector have focused primarily on various modes and usage of ICT tools and benefits of the same. However, there is dearth of studies focusing on the attitude of teaching fraternity towards ICT, as they are the actual users of the same. Further, studies focusing on faculty preferences and the factors motivating them to use ICT have not been explored much especially in Indian context. The paper reports on actual knowledge and usage of computers and various ICT tools by faculty and

their preferences and factors prompting them to adopt ICT and finally measuring the impact of ICT on teaching.

#### Objectives and Hypotheses of the Study

The prime objective of the research is to determine the current usage of ICT among schools, colleges and professional institutes in selected districts of Punjab.

The specific objectives are:

- To explore the frequency and purpose of using ICT tools among teachers.
- To study the factors influencing the usage of ICT among teachers.
- To study the impact of ICT on teaching and learning.

#### Hypotheses of the Study

**H01:** There is no significant relation between male and female teachers and their ICT usage.

**H02:** There is no significant relation between Institution of the teachers and ICT usage.

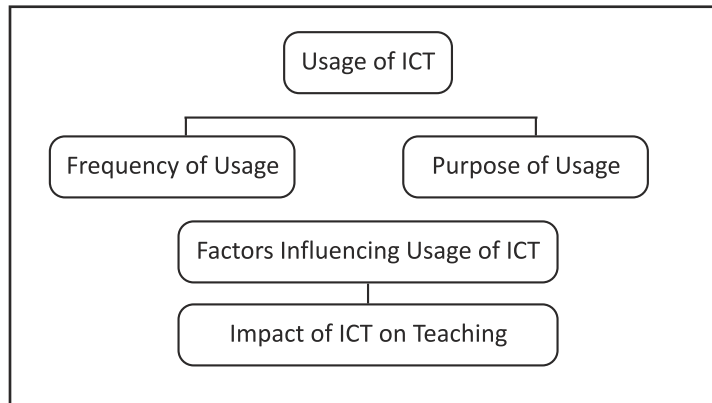
**H03:** There is no significant relation between teaching experience and ICT usage.

**H04:** There is no significant relation between subject taught and ICT usage.

#### Research Methodology

All educational institutes viz, schools, degree colleges, professional colleges of Northern Indian state Punjab comprises the universe of the study. A well-structured questionnaire for ICT usage was mainly adapted from the studies conducted by (Gujjar et al.2013; Sadaf et al. 2012, Jager and Lokman, 1999). The face and content validity of the questionnaire was checked with the help of two IT professionals and two members from department of higher

Fig 5.1 Research Model



education, so as to validate the correctness of questions asked. After all the preliminary work, the questionnaire was sent to Two hundred and twenty (220) faculty members of various institutes of Punjab namely Amritsar, Ludhiana, Jalandhar, Chandigarh, Bathinda and Moga using judgmental sampling technique. However, the results were finally analyzed and reported only for two hundred (200) responses only, as ten questionnaires were not filled correctly and ten questionnaires were half filled. Thus the final response rate was 66.7 percent. The response rate for surveys generally varies from 35-75 percent and 66.7 percent response rate can be considered good enough (Dommeyer et al. 2004). The questionnaire consists of demographic profile of the faculty members. Questions were also asked related to attitude towards computers, knowledge of ICT, frequency of usage, preferences of various ICT tools. Question on exploration of factors influencing usage of ICT has been asked on Likert scale. The model used for exploring the objectives has been depicted as below:

The reliability of the questionnaire was checked using Cronbach Alpha. The alpha reliability of (0.810) was obtained which shows that the research instrument is reliable (Olulube, P, 2006; Saunders, Lewis &

Thornhill, 2000).

## Results, Analysis and Findings

The survey based on the study of 100 faculty members of different schools and colleges of Punjab threw light on some interesting as well as striking observations about the usage of Information and Communication Technology (ICT).

### 6.1 Demographic Profile of Respondents

According to Table 6.1, the demographic features of the respondents reveal that majority (65%) of the teachers was female and (35%) teachers were male. Majority of teachers (37%) belongs to management colleges followed by (24%) teachers belonging to higher secondary school. The surveyed teachers were quiet experienced and majority (46%) had experience of 5-10 years in teaching. The teachers surveyed were mainly from management colleges (47%) and (22%) from arts college.

### 6.2 Demographic Variables and Usage of ICT

In India, the government is putting effort to make all educational institutes more techno

**Table 6.1: Descriptive Statistics of Demographic Profile of Teachers Surveyed**

Demographic Factors	Number of Respondents
<b>Gender of Respondent</b>	
Male Teachers	70(35)
Female Teachers	130(65)
<b>Institution of Respondent</b>	
Professional College	74(37)
Degree College	38(19)
Higher secondary School	48(24)
Primary School	40(20)
<b>Experience in Years</b>	
1-5 years (Code 1)	56(28)
5-10 years (Code 2)	92(46)
10 or above(Code 3)	52(26)
<b>Subject Areas</b>	
Basic Sciences	24(12)
Management	94(47)
Arts	44(22)
Applied Science	38(19)

Source: Authors Own Calculations

\*Figures in parentheses are in percentage

savvy. Teachers are the backbone of the educational institutes and hence, there is a need to explore relation between the characteristics of teachers in terms of their gender, their experience and the type of subjects and their ICT usage. In order to validate the significance of relation between the demographic profile of the faculty and ICT usage, hypothesis Ho1, Ho2, Ho3, Ho4 has been formulated and tested. For hypothesis testing, independent sample t-test and ANOVA has been applied and the results of the various

hypotheses testing tests have been shown below:

**H01:** There is no significant relation between male and female teachers and their ICT usage.

**H02:** There is no significant relation between Institution of the teachers and ICT usage.

**H03:** There is no significant relation between teaching experience and ICT usage.

**H04:** There is no significant relation between subject taught and ICT usage.

6.2 (a) Gender and Usage of ICT

Table 6.2(a): Gender and ICT Usage- Independent Sample t-test

		Gender	Male	Female	T	Sig.
ICT Usage Score	Mean		2.49	2.74	-1.292	.198*
	S.D		.919	.940		

Source: Authors Own Calculations

\*N.S @ 5 %level of significance

6.2(b) Type of Institution and Usage of ICT

Table No. 6.2(b): ANOVA between Type of Institution and ICT Usage

ICT Score	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9.394	3	3.131	2.286	.084*
Within Groups	131.516	96	1.370		
Total	140.910	99			

Source: Authors Own Calculations

\*N.S @ 5 %level of significance

6.2(c) Years of Experience and Usage of ICT

Table No. 6.2(c) : ANOVA between Years of Experience and ICT Usage

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.668	2	1.334	.936	.396*
Within Groups	138.242	97	1.425		
Total	140.910	99			

Source: Authors Own Calculations

\*N.S @ 5 %level of significance

6.2(d) Subject Taught and Usage of ICT

Table No 6.2(d): ANOVA between Subject Taught and ICT Usage

ICT Usage	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	15.864	3	5.288	4.060	.009*
Within Groups	125.046	96	1.303		
Total	140.910	99			

Source: Authors Own Calculations

\*Significant @ 5 %level of significance

The perusal of table 6.2(a), 6.2(b), 6.2(c), 6.2(d) revealed that there is significant

relation between the subjects taught by teachers and their ICT usage. Hence, the study

results reject Ho4. It can also be deduced from the study that in subjects like management and applied sciences teachers can use ICT usage for classroom teaching, like PPT and audio Visual aids. On the contrary for subjects like basic sciences, the practical exposure is more required rather than usage of techniques like PPTs and Audio Visuals. The survey results found no significant relation between other demographic variables viz. gender of teachers, type of institution and years of experience with ICT usage as revealed by t-test and ANOVA results. Hence, the null hypotheses Ho1, Ho2 and Ho3 respectively cannot be rejected (in tandem with Gujjar et al. 2013).

### 6.3 Factors Encourages for Using Technology

The surveyed teachers were asked to give their agreement on factors that motivates or encourages them to use more and more technology in their working. The results have been depicted in table 6.3.

The glimpse of table 6.3 shows that the major factor due to which teachers are motivated to use ICT is it provides opportunity to develop instructional material (Mean=2.08, S.F=0.55). It can also be observed that in many institutes it is compulsory to update their course material online through portals like Moodle etc, which might be the reason for teachers to use ICT. Further because of policy matter in the institute (Mean =2.04, S.D=0.34) teachers feel encouraged to use ICT tools.

### Factor Analysis

#### Preliminary Test

Factor analysis as a data reduction technique needs to be validated before application on the data. Two basic assumptions of factor analysis i.e normality and sampling adequacy should be tested (Grimm and Yarnold, 1995; George and Mallery, 1999; Lattin et al., 2003) before extracting the factors. Kaiser Meyer Olkin as a measure of sampling adequacy and Bartlett's test of sphericity to measure the multivariate

**Table 6.3: Factors Motivating for Using Technology**

Sr. No.	Factors	Mean	S.D	Rank
F1	ICT rewards teachers by task related incentives (salary, promotion etc.)	1.14	0.83	7th
F2	ICT provide opportunities to teachers for developing instructional materials	2.08	0.55	1st
F3	ICT helps in developing easy way for teaching	1.4	0.55	6th
F4	ICT is used because of availability of high quality equipment in my institute	1.5	0.54	5th
F5	ICT provides time to prepare, explore and develop	1.9	0.59	3rd
F6	ICT is used as training/courses for use of ICT are provided	1.86	0.60	4th
F7	ICT are used as a matter of policy on using ICT across curriculum	2.04	0.34	2nd

Source: Authors Own Calculation Scale range:

1-4 (1 indicates lowest and 4 indicates highest)



**Table 1: Selected Items in Each Factor from the Teaching Fraternity Survey**

<b>Factor and Examples of Items in each factor(Total No. of Items)</b>	<b>Factor Loadings</b>
<b>Factor 1: ICT helps in student centered teaching</b>	
ICT helps in motivating students	.850
Usage of ICT is very enjoyable	.701
Usage of ICT helps in improving presentation of material	.648
Usage of ICT is fun for students	.595
Usage of ICT helps in making lessons more diverse	.589
Usage of ICT helps on making lesson more interesting	.443
<b>Factor 2: ICT helps in attracting student's attention</b>	
Usage of ICT helps in administrative tasks	.820
Usage of ICT gives more power to teacher	.772
Usage of ICT helps in making teaching easier	.665
Usage of ICT helps on making lesson more interesting	.596
<b>Factor 3:ICT infrastructural requirements are not cumbersome</b>	
Usage of ICT is too expensive to use regularly	.889
Usage of ICT requires more technical support	.862
Usage of ICT restricts the content of lesson	.637
<b>Factor 4:ICT helps in teacher centered learning and enhancing teacher stature</b>	
Usage of ICT enhances my career prospects	.733
Usage of ICT give teacher me more confidence	.683
Usage of ICT helps in improving presentation of material	.446
<b>Factor 5: Use of ICT is enjoyable among teachers</b>	
Usage of ICT give me more prestige	.708
Usage of ICT is very enjoyable	.581
Usage of ICT give teacher me more confidence	.517

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.757
Bartlett's Test of Sphericity	Approx. Chi-Square	630.191
	df	105
	Sig.	.000

normality of the variables can be used. In addition, it tests whether the correlation matrix is an identity matrix (i.e., a spherical set of multivariate data) (George and Mallery, 1999; Lattin et al., 2003).

It is imperative to measure the impact of ICT on teaching and learning, so that ICT as a tool

replacing the traditional teaching pedagogy can be applied rigorously and benefits can be retrieved. The usage of ICT and its impact on teaching has remained a debatable issue, so to uncover the real impact this question was asked from the teachers using ICT and the response is as follows:

**Table 6.4: Impact of ICT Usage on Teaching**

Sr. No	Impact of ICT	Mean	S. D.	Rank
11	It helps in motivating students	1.82	0.54	2nd
12	It helps in achievement	1.48	0.74	3rd
13	It helps in higher order thinking skills	1.02	0.42	4th
14	It helps in gaining attention	2.31	0.63	1st

Source: Authors Own Calculation Scale range:

1-4 (1 indicates lowest and 4 indicates highest)

The results of the survey revealed (as depicted in table 6.4) that ICT can help in gaining attention of students (Mean=2.31, S.D=0.63), but they cannot help in achieving achievement and higher order thinking skills (Jager and Lokman 1999; Janssen Reinen, 1999). Hence, use of ICT only as an administrative tool can be used, but replacing it with the traditional methods of teaching requires caution and in depth research.

**Conclusion**

The primary objective of the study was to

measure the nature and extent of ICT usage among the faculty members of educational institutes in Punjab. From the empirical research and findings a number of conclusions and implications can be drawn.

Study was conducted by identifying different demographic variables of teachers like gender of teachers, years of experience in teaching, subjects taught and type of institution and ICT usage. The factors motivating teachers to use ICT and the impact of ICT on teaching has also been analyzed. Application of hypothesis testing tools viz. ANOVA and independent

sample t-test results revealed significant relation between subject of teacher and usage of ICT. For other demographic variables results found to be insignificant. The survey revealed that major ICT tools (including ICT devices and Software) used by faculty in Punjab are Multimedia Computers, Projectors, Graphics (like photoshop, adobe), Social Media Websites, Search engines and Electronic mail. The paper highlights that the basic purpose of using ICT among surveyed teachers is for entering the attendance record of students or viewing attendance record of their students. Another use of ICT among teachers was for administrating student's internal or external assessment. This clearly shows that ICT is useful as an administrative and supportive tool, whereas the use of ICT for lecture preparation or for purpose of improving quality of lecture was least amongst the teaching fraternity.

The five major factors affecting teaching fraternity perception towards use of ICT were 1) ICT helps in student centered teaching 2) ICT helps in attracting student attention 3) ICT infrastructure requirements are not cumbersome 4) ICT helps in teacher centered learning and enhancing teacher stature and 5) Use of ICT is enjoyable among teachers.

Hence, it can be said that India is becoming educational hub but still the quality of education is a biggest question mark. The use of ICT has flooded the economy, but the application of same in educational field needs a caution. Further, ICT and various tools have vast technical potential, but the real innovative use of ICT is not broadly adopted in educational institutes of Punjab.

### **Implications for Future Research**

Information and Communication Technology has centre-staged every field in present times.

The usage of ICT and its tools are commendable in diverse fields, however, the use and impact of the same in teaching is still not apparent. Number of studies on usage and factors influencing usage of ICT in education institutes has been conducted in foreign countries, but in India, the studies are few. Present study has made a niche attempt to uncover the faculty profile and their usage of ICT in one of the states of India. In order to gain a deep insight, more states should be included and the coverage of questions should be more focused on factors influencing usage of ICT both from teachers as well as student's perspective and impact of ICT usage on teaching as well as learning. In this paper, univariate and descriptive statistics have been used, further to analyze the results and to comprehend the significance, sophisticated multivariate techniques can be applied so that the results can be generalized and can add more value to the present literature.

### **References**

- Afshari, M, Bakar, K.A, Luan, W.S, Samah, B.A, and Fooi, F.S (2009). Factors Affecting Teachers' Use of Information and Communication Technology, *International Journal of Instruction* 2(1), 77-104.
- Aijaz, A. G. (2013). A Study of the Attitudes of Student Teachers toward Use of Computer. *Pakistan Journal of Commerce and Social Sciences*, 7 (2), 346-353.
- Ayesha, S. (2012). Exploring Factors that Predict Preservice Teachers' Intentions to Use Web 2.0 Technologies Using Decomposed Theory of Planned Behavior. *International Society for Technology in Education*, 171-197.
- Anonymous (N.D.) NMC Horizon Report 2013 Higher Education Edition, available at <http://redarchive.nmc.org/publications/201>

3-horizon-report-higher-ed, accessed on December 16th, 2015.

Champan, David, W. & Mahlack, Lars. O., (2004) Adapting technology for school improvement: a global perspective, International Institute for Educational Planning, Paris, ISBN: 92-803-1255-3.

Cox, M.J., Preston, C., & Cox, K. (1999). What Motivates Teachers to use ICT?. Paper presented at the British Educational Research Association Conference. Brighton. September.

Dahlstrom, E. (2012) ECAR Study of Undergraduate Students and Information Technology, 2012, available at <http://www.educause.edu/library/resources/ecar-study-undergraduate-students-and-information-technology-2012>, accessed on December 2, 2015.

Dommeyer, C.J., P. Baum, R.W. Hanna, and K.S. Chapman (2004). Gathering faculty teaching evaluations by in-class and online surveys: their effects on response rates and evaluations. *Assessment & Evaluation in Higher Education* 29, no. 5: 611-623.

Gujjar, Aijaz, A, Tabassum, Muhammad, N.R.,(2013). A Study of the Attitudes of Student Teachers toward Use of Computer, *Pakistan Journal of Commerce and Social Sciences*. 7 (2), 346-353.

Gulbahar, Y., & Guven, I. (2008). A Survey on ICT Usage and the Perceptions of Social Studies Teachers in Turkey. *Educational Technology & Society*, 11 (3), 37-51.

Guma, A., Haolader, F. A, Muhammad, K. (2013). The Role of ICT to Make Teaching-Learning Effective in Higher Institutions of Learning in Uganda , *International Journal of Innovative Research in Science, Engineering and Technology*, 2( 8), 4061-4081.

Hartshorne, R., & Ajjan, H. (2009). Examining student decisions to adopt Web 2.0

technologies: Theory and Empirical tests. *Journal of Computing in Higher Education*, 21(3), 183-198.

Jager, A.K. and Lokman, A.H., (1999). Impact of ICT in education- The role of the teacher and teacher training. Paper Presented at the European Conference on Educational Research, Lahti, Finland 22 - 25.

Janssen Reinen , I.A.M. (1999). Vocational and adult education ; ICT monitor 1997/1998. Enschede: University of Twente , OCTO , Research Centre of Applied Education

Medlin, B. D. (2001). The Factors that May Influence a Faculty Member's Decision to Adopt Electronic Technologies in Instruction, doctoral dissertation, Virginia Polytechnic Institute and State University.

Mittal, S. (2015). Evaluating the benefits of E-learning Systems as perceived by School Teachers in India: An SEM approach, *BVIMR Management Edge*, 8(1), 1-12

Moonen, J. & Kommers, P. (1995). Implementation of Communication and Information Technology in education. Enscheda: OCTO, University of Twente.

Mumtaz, S. (2006). Factors affecting teachers' use of information and communications technology: a review of the literature, *Journal of Information Technology for Teacher Education*, 19, 319-341.

Ololube, Prince, N. (2006, August 10). Appraising the relationship between ICT usage and integration and the standard of teacher education programs in a developing economy. *International Journal of Education and Development using ICT [Online]*, 2(3). Available: <http://ijedict.dec.uwi.edu/view/article.php?id=194&layout=html>.

Osibanjo, O.A., and Damagum, Y.M. (2011). Factors Affecting Application of ICT by Managers in the Nigerian Public Sector,

Petroleum-Gas University of Ploiestien BULLETIN, LXIII (1/2011) 37 - 44 Economic Sciences Series.

Pearson Foundation (2012). Pearson Foundation Survey on Students and Tablets available at accessed on [http://online.annamaria.edu/sites/amc/files/PF\\_Tablet\\_Survey\\_Summary\\_2012.pdf](http://online.annamaria.edu/sites/amc/files/PF_Tablet_Survey_Summary_2012.pdf).

Pelgrum W.J. (2002). The Effectiveness of ICT in Schools: Current Trends and Future Prospects. *Organization for Economic Cooperation and Development*, 20 (2), 48-61.

Pelgrum, W.J. (2001). Obstacles to the Integration of ICT in Education: Results from a Worldwide Educational Assessment. *Computers & Education* 37, 163-178.

Pelgrum, W.J. (2002). Teachers, Teacher Policies And ICT. OECD/Japan Seminar Tokyo, Japan, 5-6 December 2002, The Effectiveness Of ICT in Schools: Current Trends And Future Prospects.

Plomp, Tj. Brummelhis, A.C.A., & Rapmund, R. (1996). Teaching and Learning for the Future. Report of the Committee on Multimedia in Teacher Training (COMMITT). Den Haag: SDU.

Sadaf, A., Newby, Timothy J and Ertmer, Peggy A. (2012). Exploring Factors that Predict Preservice Teachers' Intentions to Use Web 2.0 Technologies Using Decomposed Theory of Planned Behavior, *Journal of Research on Technology in Education*, 45 (2), 171-196

Saunders, M., Lewis, P., & Thornhill, A., (2009), *Research Methods for Business Students*, Pearson Education, Edinburg Gate, England.

SER (1998). *ICT and Education: The Hauge*, SER Social and Economic Council.

Shazia M. (2009). Factors Affecting Teachers' Use of Information and Communications Technology: a review of the Literature. *Journal*

*of Information Technology for Teacher Education*, 9(3), 2000.

Shihab, M. (2008). Web 2.0 tools improve teaching and collaboration in English language classes. Presented at the National Educational Computing Conference 2008, San Antonio, TX, available at [http://www.iste.org/Content/NavigationMenu/Research/NECC\\_Research\\_Paper\\_Archives/NECC2008/Shihab.pdf](http://www.iste.org/Content/NavigationMenu/Research/NECC_Research_Paper_Archives/NECC2008/Shihab.pdf)

Smeets, Ed.(2005). Does ICT Contribute to Powerful Learning Environments in Primary Education? *Computers & Education*, Vol.44, Issue 3, pp: 343-355.

Usluel, Y. K., Aşkar, P., & Bas, T. (2008). A Structural Equation Model for ICT Usage in Higher Education. *Educational Technology & Society*, 11 (2), 262-273.

Volman, M., & Van Eck, E. (2001). Gender Equity and Information Technology in Education: The Second Decade. *Review of Educational Research*, 71(4), 613-634.

Volman, M., & Van Eck, E. (2001). Gender Equity and Information Technology in Education: The Second Decade. *Review of Educational Research*, 71(4), 613-634.

Voogt, J. (2003). Consequences of ICT for Aims, Contents, Processes and Environments of Learning. In J. van den Akker, W. Kuiper, & U. Hameyer (Eds.), *Curriculum landscapes and trends* (blz. 217-236). Dordrecht: Kluwer.

Waldeck, J. H., & Dougherty, K., (2012). Collaborative communication technologies and learning in college courses: which are used, for what purposes, and to what ends? *Learning, Media and Technology* Volume 37, Issue 4, pp: 355-378.

Zhao, Y. & Cziko, G. A. (2001). Teacher adoption of technology: a perceptual control theory perspective. *Journal of Technology and Teacher Education*, 9 (1), 5-30.