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FACTORS AFFECTING ICT USAGE IN CLASS: AN EXPLORATION OF TEACHERS' PERCEPTIONS

Abstract

Undoubtedly information and communication technology (ICT) has become a strategic alternative for Higher education in this globalized world. This requires University teachers to be proficient in the ICT usage. Previous researches focused on variables directly linked with teachers thus showing the weak ICT integration level especially in Western settings. This study aimed to identify the factors which affected the use of ICT tools and intended to explore the perceptions of university teachers about ICT. For this, "Information and Communication Technology Usage Survey" scale was administered to university teachers of the Punjab. All university teachers of the Punjab were included into population of the study. Two stage sampling technique was used, at first stage the universities were selected proportionately from total eighteen universities chartered by the government of Punjab. Thirty percent of population i.e., five universities formed the sample. These five universities were selected randomly through lottery method. At second stage teachers were selected through random sampling. Descriptive statistics, Pearson Correlation Coefficient and t-test were used to analyze the data. The results indicate that large number of teachers had access to computers as well as to internet at home and workplace. The results also showed that teachers had high level of perceived expertise in using multiple software of computer, mainly in word, excel, power point, using search engines and emailing. The

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results also indicate that although they had high level of expertise in using computer software, they usually preferred to use blackboard as supporting teaching medium. The results also indicated a positive relationship between self-efficacy belief and perceived expertise level for using computers.

Keywords: *Information and Communication Technology (ICT), Higher education, University Teachers*

Introduction

The term information and communication technology is echoed more than ever before, the advent of technology has effected every aspect of life and these tools are now considered essential ingredient of advancement. Educational value of these tools is also well established (Williams, 2003), however to gain maximum benefit from this technology the teachers must be willing to integrate these technologies in teaching and learning process. Positive attitude of teachers and high self-efficacy belief are vital for effective use of information and communication technology **(**Milbrath & Kinzie, 2000).

Importance of integrating this technology in teaching-learning process at higher education level cannot be ignored (Pulkkinen, 2007). At this level the students are prepared with particular focus of market and employability. So it is necessary to use these tools at higher education institutes more frequently (Gibson, et.al., 2002). This trend is although accepted widely all over the globe, however, in native scenario still there are factors that hinder the use of ICT in teaching, letting one to assume that either the teachers do not have skill to use these tools effectively or they have low self-efficacy belief about using them. This study aim to find perception of teachers about factors that may hinder the use of ICT in teaching.

As stated earlier that information and communication technology has gained an important role in many fields of life in recent years. Ample technology has influenced every aspect of individual life at home, institutions and organizations (Elliott, 2006). Education is not an exception, so idea of integrating ICT with education is gaining popularity since previous two decades (Paas & Creech, 2008). As a result of it many educational institutions has incorporated ICT in teaching-learning process (Ertmer, 2005; Juang et al., 2008; Friedman et al.,2009; Steel, 2009; Ismail et al., 2010).

Higher education institutions are using ICT as a tool for development of curriculum, improving teaching-learning process as well as for development of staff (Kumpulainen, 2007; Usluel et al., 2008). It is assumed that ICT has potential to bring revolution in field of education by improving pedagogy and improving standards as well as quality of teaching and learning process (Albirini, 2006; Reynolds et.al., 2003). Same trend has been accepted by native government admitting that to become a knowledge society and to compete with world it is necessary to inculcate information and communication technology in teaching and learning process. As a result of it many initiatives has been taken in this regards for example development of draft National IT policy 2012, establishment of Arfaa kreem IT tower, distribution of laptops to talented students through Youth initiative program and most recently establishment of Smart schools.

Role of teacher is very important in order to succeed in these efforts. Many research studies have proved that teacher plays a vital role in integrating ICT in teaching and learning process effectively (Lee et al., 2003), so the teachers should be well informed and well equipped for using ICT for improving learning environment and performance of students (ACS, 2005).

Although many facilities have been provided to the teachers of higher education institutions however it should be noted that knowledge and skill alone is not enough to motivate teachers for using ICT during lectures but attitudes and belief (Albion, 1999; Mumtaz, 2000) and facilities to access technology easily and technical support provided by the institute (Norris et.al., 2003) are also important factors that encourage teachers to integrate ICT.

Inspite of established importance of ICT all around the globe, the research studies also indicate that ratio of using and implementing ICT during teaching and learning process is lower than claimed Oliver (2002). There are supporters and opponents of using information and communication technology during teaching. The opponents have negative attitude towards ICT usage due to lack of training in IT skills, fear of failure and lack of adequate support (Toomey, 2001).

Zhao and Cziko (2001) have identified three conditions which are necessary for teachers to introduce ICT in classroom. These include teacher's believe on effectiveness of technology, secondly teacher's belief that the technology will not cause any disturbance in their class and thirdly the belief of the teacher that they have control over technology. Similar results were given by the research of Demetriadis et al. (2003) that the although the teachers welcome training opportunity however constant support is required to inculcate believe in teachers that they are able to use technology in classroom. Roger (1995) has identified five major factors that affect the people's attitude towards technology including relative advantage (i.e., the innovation is advantageous), compatibility (i.e., the innovation is compatible with current practices), complexity (i.e., the innovation is easy to understand and apply), observe-ability (i.e., the use of this innovation shows observable results), trial-ability (i.e., the innovation can be used on trial bases before it is adopted).

Braun and Kraft (1995) has emphasized on the need of integrating technology in teaching-learning process for preparing the students to face the real life. However many researches showed that although teachers appreciate its use and significance, however, they do not use that in actual classroom environment. The research study conducted by Harris (2002) suggests that the maximum benefit can be gained from ICT usage when the teachers are confident and willing to explore new opportunities for changing their classroom practices by using ICT. Effective transmission of knowledge is required positive attitude of teachers towards ICT (Woodrow, 1992). On the other hand for development of positive attitude first require removal of obstacles that might hinder resistance for the teachers to integrate technology in the classroom (Watson, 1998). The word of ICT is translated as synonymous to e-learning in education. It can be defined as the use of information and communication technology for augmenting the teaching and learning process in educational settings. At higher level it is also considered as synonymous to online learning, which refers to learning by using internet (Tinio, 2002; Sife et al., 2007).

There are various factors that obstruct integration of ICT in education including lack of motivation and perception of attitude of teachers to use ICT tools during teaching (Oliver, 2002). All the definitions above emphasize importance of role of technology in enhancing learning of students. These also emphasize importance of teachers' perceptions, skills and attitudes towards integrating technology in teaching/learning process. This paper aims to explore attitude of teachers about usage of communication and information technology in classroom. This also aims to identify the barriers that hinder the use of ICT during teaching and learning process.

Objectives of the study

Major objective of the study was to explore the factors that support or hinder the use of ICT during teaching at university level. Secondary objective was to find out attitude of teachers towards ICT usage in teaching-learning process.

Methodology

To achieve target of the study a survey research design was used. It is preferred in the research studies where opinion from a large number of population and sample is required. It is also used in studies where demographic information is necessary to clarify composition of sample (McIntyre, 2006). In addition to this survey research design is best or the studies that aims to measure attitude as it is difficult to gather information regarding attitude through other data collecting means (McIntyre, 2006). As aim of this study was to explore the perception of teachers regarding factors that are serving as obstacles in using ICT in classroom at university level so it was assumed that survey research design could serve better for current study.

Research Questions

Following research questions were derived on the basis of objectives in order to achieve target of the study;

1. Which ICT resources (software, instructional tools and materials) are most popular among university teachers?
2. Which methods are more preferred for professional development by university teachers?
3. What motivate or discourage university teachers to use information and communication technology in class room?

4. Is there any relationship between self-efficacy and self-rated expertise?
5. Is there any relationship between self-rated expertise level and frequency of using ICT tools in classroom?
6. Is there any difference in self-efficacy belief of teachers possessing any training in form of diploma or certificate and who do not have any sort of training?

Population and Sampling

All university teachers of the Punjab were included into population of the study. Two stage sampling technique was used, at first stage the universities were selected proportionately from total eighteen universities chartered by government of Punjab. Thirty percent of population i.e., five universities were included in sample. These five universities were selected randomly through lottery method. At second stage teachers were selected through random sampling. About 350 survey forms were distributed to teachers of different departments and universities, however response was very low and researcher got response from 155 respondents, five forms were not filled completely so they were not included in the study.

Instrument

The information and communication technology usage survey developed by Gulbahar and Guven (2008) was used to collect data. The survey consists of five parts, first part consist of twenty four items regarding the usage self-expertise level of university teachers about the use of instructional tools and materials. The second part was composed of nine items regarding preference of teachers for professional development for collecting information. The third part was composed of eight items regarding the factors that motivate or encourage the teachers to use technology. The

fourth part of the survey consists of eighteen items regarding perception of self-efficacy. The last part was composed of nineteen items investigating about the barriers that teachers face while using technology during teaching-learning process.

Results

To achieve target of the study multiple statistical techniques including descriptive statistics, correlation and t-test were applied as per requirement of the research question. First part of the instrument was composed of statement regarding demographic information. The respondents were asked that either they have computers available at home or workplace, and how much time they use to spent on computers.

Table 1 Percentage of responses on demographic variables

Statements	Percentages %
Own computer at home	82%
Facility of computer at office	82%
Facility of internet at home	75%
Facility of internet at office	80%

The results show that majority of the teachers in universities i.e., almost 82 % of teachers have access to computers at home and same number of teachers has facility of internet available at work place. Similarly about 75% of the respondents have access to internet at home while 80% of them have facility of internet at home.

Table 2 Shows responses on time spend on internet usage.

Time Spent on computer	Less than one hour	1-3 hours	3-5 hours	More than five hours
Percentage	20 %	30 %	28 %	22 %

About the statement of daily computer usage the results show that 20 % of university teachers have computer use less than one hour while 30 % of them use computer from an hour to three hours, while only 22 % of them use computers for more than five hours. In addition to this about 28 % of the respondents use computers for three to five hours per day. In the questionnaire the teachers were also asked to specify their level of expertise on using different types of software. The statement regarding these thirteen statements were made on three point liker scale rating expertise level from good to average and poor. The results are shown in following table;

Table 3 Reponses on skills level of using different computer software

Sr #	Statements	Poor%	Average %	Good %
1	Word process	54	31	15
2	Excel	40	29	31
3	Power point	45	15	40
4	Emailing	72	15	13
5	Internet browsing	72	09	19
6	Access	80	13	07
7	Electronic encyclopedia	80	12	08
9	Instructional films	80	15	05
10	Spread sheet	75	19	06
11	Data bases	85	11	04
12	Computer aided software	80	17	03
13	Webpage development	89	09	02

About 54% teachers claimed that they have good skills to use word process, while 40 and 45 percent of them were confident about using excel and power point software proficiently. On the other hand 72% of the respondents reported themselves as good in browsing and surfing through different search engines as well as in emailing. About 80 percent of the respondents were not able

to use other software like access, electronic encyclopedia and instructional films. The teachers were also asked about usage of instructional tools materials and they were given eleven types options. Percentages of responses for most popular instructional tools are as follows;

Table 4 Percentage of responses of preferred instructional tools

Sr #	Tools	Percentages
1	Board (White/Black)	64%
2	Printed materials	62%
3	Multimedia and computers	34%
4	TV, camera and videos	15 %

The most popular and preferred tools by teachers include board as it was preferred by 64% of the respondents, printed material; preferred by 62% of participants of study and multimedia and computers preferred by 34%. While overhead projector, television, radio, video cameras were least preferred instructional tools. Second part of the instruments composed of statements regarding preferred methods for professional development under two sub scales i.e., accessing the knowledge and support services. For this purpose three point Likert scale was used ranging from prefer to not preferred. Following table shows percentages of respondents on most preferred means for professional development.

Table 5 Percentage of responses on preferred means for professional development in terms of ICT

Sr #	Statements	Most preferred Methods %	Least preferred methods %
1	Printed materials	81 %	19%
2	Internet-resources	77%	22 %
3	Self-study	72%	28 %
4	Workshops and seminars	77%	22 %
5	Colleagues	48 %	52 %
6	Technical support department	54 %	46 %

It is evident from the table that most common and popular resources to gain knowledge for university teachers were printed material (81%), internet resources (77%), self-study (72%) and participating in workshops and seminars (77%). However taking help from colleagues and technical department of universities was not highly appreciated as only 48 and 54 percent of the respondents preferred this mode of support. Third part of the instrument was concerned with factors that encourage and motivate teachers for using information and communication technology during teaching-learning process. For this purpose three point Likert scale ranging from important to not very important was used. Following table shows percentages of responses regarding use of reward, improved infrastructure, training, support, policies, provision of instructional material, research and reduction in workload while working on development of support material for use in teaching as source of motivation of teachers to integrate ICT in teaching-learning process.

Table 6 Factors affecting use of technology during teaching-learning process

Sr #	Statement	Important %	Neutral %	Not very important %
1	Reward	85.6	14.4	---
2	improved infrastructure	88.4	11.6	---
3	Continuous training	78.8	18.5	2.7
4	Support	79.5	18.5	1.4
5	Institutional policies	65.1	30.8	4.1
6	Provision of instructional material	74	24	2.1
7	Research	78.8	16.4	4.8
8	Reduction in workload	80.8	12.3	6.8

Fourth part of the instrument was composed of the statements regarding self-efficacy belief of teachers for using information and

communication technology. Following table show responses of teachers on perceived self-efficacy scale:

Table 7 Barriers in ICT integration as perceived by teachers

Sr #	Statements	Agree %	Neutral %	Disagree %
1	Insufficient time	55.6	28.7	14.6
2	Insufficient technical knowledge	52.1	31.2	15.3
3	Difficulty in accessing support	52.1	31.2	15.3
4	Unproductive computer lab	63.9	23.6	12.5
5	Insufficient technical infrastructure	50.7	31.0	16.2
6	Unavailability of ICT tools	56.7	20.6	22.7
7	Scarcity of available computers	64.6	25.0	10.4
8	Lack of reward	61.8	24.3	13.9
9	Insufficient technical support to student	70.1	25.0	4.9
10	Shortage of computers for learners	61.1	31.2	7.6
11	Insufficient guidance	62.5	22.2	15.3
12	Lack of financial resources	54.2	34.0	11.8
13	Unavailability of instructional resources	62.5	25.7	11.8
14	Poor instructional resources	56.2	20.8	22.9
15	Access to technology	54.2	32.4	13.4
16	Lack of training	62.5	25.0	10.4
17	Lack of support while developing support material	50.0	34.7	15.3
18	Inappropriate teaching methods	54.9	34.7	10.4
19	Shortage of computer courses offered to students	59.0	31.9	9.0

In addition to this correlation was applied to find out relationship between perceived self-efficacy and perceived self-expertise level of teachers about computer usage. Pearson product correlation was used, following table shows;

Table 8 Correlation to find out relationship between self-efficacy, perceived expertise and frequency of using ICT tools

	Perceived level of expertise	Frequency of using ICT tools
Perceived self-efficacy	.022	---
Perceived level of expertise	---	.000

The relationship between self-efficacy and expertise level of respondent was investigated by using Pearson product-moment correlation coefficient. There was a weak but positive relationship between two variables, r=.022, n=148, p<.05 similarly same procedure was carried out to find out relationship between perceived self-efficacy and frequency of using ICT tools in class. There was a positive relationship between two variables, r= .000, n=148, p<. 01.

In addition to this independent sample t-test was applied to find out mean difference between perceived self-efficacy and training of computer i.e., diploma or certificate. It was assumed that the individuals who hold any sort of training in computers have high level of self-efficacy. The results show a significant difference between two groups as show in table below:

Table 10   Independent sample t-test to find out difference between training and self-efficacy

	t value	Df	Sig.
Perceived self-efficacy	-2.03	148	.04

An independent sample t-test was conducted to compare scores of self-expertise level with training degree or diploma in computer. There was a significant difference in scores of the people who gained training (yes=45.2, SD= 7.60) and who did not get any training (no= 43.15, SD= 3.57; t (148) = -2.03, p=.04 (two-tailed).

Discussion and Conclusion

The results indicate that large number of teachers have access to computers as well as to internet at home and workplace. This information was necessary to identify time spent in using computers indicating skill level of users. In order to find answer of first research question, the teachers were asked about their perceived expertise level on multiple software and their preferences to use these as teaching add. The results shows that teachers have high level of perceived expertise in using multiple software of computer, mainly in word, excel, power point, using search engines and emailing. Contrary to this the results also indicate that although they have high level of expertise in using computer software, they usually prefer to use blackboard as supporting teaching medium. This might be due to many factors like unavailability and limited access to ICT tools in institutions. This was also confirmed by the results of statements regarding barriers to use ICT during lectures. Other obstacles like lack of support from technical infrastructure in institutions, lack of time, lack of technical skills, scarcity of resources and lack of training are also in consent with previous studies (Mee Chin & Zaitun 2006; Qudais et. al., 2010; Agbatogun 2010; Leggett & Persichitte1998).

Regarding second question about preferred methods for professional development, the workshops and seminars were termed as most preferred methods rather than taking help from colleague. Similarly third research question regarding factors that motivate teachers to use ICT in classroom, the results indicate that availability of infrastructure was one of highly ranked factor that encourage use of information and communication technology during teaching process. Same factor i.e., lack of infrastructure (non-availability of resources) serve as major barrier in using ICT in classroom.

In order to get answers of research questions four and five, correlation was run. The results also show there is a positive relationship between self-efficacy belief and perceived expertise level for using computers. These results are in consensus with previous studies indicating that more expert and experienced a teacher in computer usage has more positive attitude towards using it (Rozell & Gardner, 1999). There is also a positive relationship between self-efficacy and integration of ICT tools during teaching. These results are also supported by previous studies (Hew & Brush, 2007; Keengwe & Onchwari, 2008; Van Braak, et al., 2004; Woodrow, 1992).

While to answer final research question the t-test was carried out. The results of scores on training and self-efficacy are significant, showing that the individuals who have got any certification or training in computers have high level of ICT self-efficacy. Same results are presented in studies conducted by (Agbatogun,et al., 2010; Dogan, 2010).

Objective of the study was to explore factors that are serving as hindrance or as motivational factors for university teachers for using information and communication technology in classroom. The results indicate that lack/availability of infrastructure and support from institution serve as major motivator and obstacles for making a decision about integrating ICT in teaching process. Another factor that serves as barrier in this regard is lack of training. Secondary objective of the study was to explore perceived self-efficacy of teachers about using ICT and its effect on decision about integrating it in teaching process. For this purpose, information regarding perceived self-efficacy about using multiple software preferences to use these in teaching process and preferred methods to learn new was collected. The results indicate that the teachers having higher level of expertise in using computers and different software are more prone to use

ICT in class. This also support results obtained for first objective, ie., lack of training is serving as major barrier in integrating ICT in teaching learning process at university level. This indicates training of teachers regarding information and communication technology this motivating them to integrate this in teaching learning process.

Suggestions for future research

Although the results show a positive picture about perception of teachers on using information and communication technology in teaching-learning process but still there is need to identify actual practices during routine. So another study can be conducted to using observation sheet to identify actual practices. The study also show that factors that hinder integration of ICT in learning process are same as identified by previous researches and still the major supporting aid is board. However, the reason of not finding any difference might be social, cultural or personal, so there is a need to conduct study using in-depth interviews from different stakeholders to find out basic reasons.

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