Teacher's Information, Communication Technology Competence and Their Attitude toward Use of Computers in University Of The Punjab

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The purpose of the study was to assess the current level of teachers ICT competence and teachers attitude towards the use of ICT in university of the Punjab being country's leading university. Two separate questionnaires, one for teachers ICT competence and other for teacher's attitude were used to collect data. Data were collected from two randomly selected faculties of the university which were Behavioral &social sciences and faculty of education. It revealed that teachers has sufficient ICT competence and have a positive attitude towards use of computers but both variables are not correlated. The study concluded that basic and advanced level ICT training is necessary for the teachers in the university to improve their ICT competence & promote their attitude towards use of it. It is suggested that further in depth research studies should be conducted to explore the correlation of ICT competence & teachers attitudes and to find out the factors that lies behind the correlation of both variables.

Keywords: Information Communication Technology (ICT), teachers'competence, attitude, Knowledge societies

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The purpose of this research was to investigate the current level of Information Communication Technology (ICT) competence of teachers in university of the Punjab. The attitude of teachers towards the use of computers in the University of the Punjab and correlation between teachers ICT competence and their attitude was also determined. ICT has been allowed to be an important tool in the development of the teaching and learning process of education.

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The world is facing challenge of using technology as a pedagogical tool to help teacher during their job and to develop strategies that will serve to address and meet the needs of future. These are the teachers, who can integrate and implement these technologies and fulfill the future's need.

The role of ICT in education is of multidimensional. One side it facilitates and updates the development of curriculum to the use and development of web pages and news media. On the other side, it allows teachers to maintain a more comprehensive view of their discipline, integrating new pedagogies and update their knowledge, as well as improve learning environment by improving communication.

The role and job of a teacher in the new scenario of 21st century have changed and is facing the challenge of using ICT in teaching learning environment as a tool. These demands changes in the styles, attitude and skills towards information handling (Nadira & Tahira, 2010). Future demands innovations, but when we look at Pakistan, it is a tragic fact that it is characterized by a low rate of innovation and weak economic growth. Researches revealed that HEIs in the developed world provide strategically planned vision and desire for the quest of merit, in Pakistan they witnessed declining academic excellence, lack of insight, mismanagement, bad governance, ignorance and decay(world Bank, 2009; Rehman ,2008; Hussain ,2008; Boston Group,2004; Shaikh, 2011). Shaikh & Khoja. (2011) suggest that an effective and robust HES ICT policy is required for improving the status of the Pakistani knowledge based economy, thus helping establish ICT policy and planning, administration and integration at higher education level. This situation, can be improved by fully use of possibilities of ICT.

To meet the challenges of the globalization, and ICT-driven knowledge societies, improvement of higher education system due to its significance in the development of education at all levels, is call of the time. By implementing effective and robust ICT policies we can revolutionize our higher education system. In today's technology intensive society, we cannot achieve objective of the maximum human potential without utilizing information and communication technology (ICT) as admitted by the Federal Minister of education at the lunching occasion of national information and communication technology (NICT) strategies. This strategy, not only reflects current education goals but a vision for future too. It offers a practical frame work for introduction of broad range of ICT at all levels in Pakistan.

When we make comparison of ourselves with remaining world, we observe these countries are using innovative tools to enhance education. Our country is in competition with nations that have formed "Knowledge societies". These countries infused their education systems with information and communication technology (ICT). Their well educated, ICT skilled people have propelled them from the ranks of "developing" economics to "developed" once. This trend is visible world vide. In china, Estonia, India, Ireland, Macedonia, and Malaysia, the return on investment in ICT is significant. All are moving from a poor marginalized status to accelerated economic growth and higher standards of living (Ministry of Education Pakistan's report).

Teachers have been considered as change agent whenever there was a paradigm shift. Now ICT is influencing what is being learned in universities as well it is supporting changes to the way students are learning. Moves from content-centered curricula to the competency – based curricula are associated with moves away from teacher-centered forms of delivery to student centered forms. In past, teaching process involves lesson planning and just transmit knowledge often by lectures to achieve desired learning goals but ICT presents new notion that learning is an active process of constructing knowledge rather than acquiring knowledge .It also defines instruction as a process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy and Cunningham 1996)

Role of teachers in universities has changed. Typically teachers have been considered as highly qualified people only but ICT changes consider their role a step further. Wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching Higher education teachers are considered as the key factor in education innovation and in the process of change. Their competencies and attitudes are the most important factors for the success of ICT integration in education.

Conceptual framework

Since the last few decades, a dramatic rise of technologies within the field of education has seen. Teaching and instructional aides include slide projector, television radio, audio and video cassettes but currently use of computer technology has encompasses all of these. At present, majority of the ICT competencies are based on computer use like internet, www and other virtual technologies. In higher education system, comprehensive process of ICT integration primarily includes students, faculty members and administrators of the institutions (Semenov, 2005).

Faculty members, as being change agent should be willing to use these technologies in their courses and be able to reach sources when necessary. No doubt, the decisions, approaches, beliefs and attitudes of faculty members regarding the use of ICT in teaching directly influence the instructional use of computer and instruction communication technologies.

The impact of ICT on teachers is varied and may be identified as,

- the balance of roles they play with a perceived risk of reduced influence,
- providing greater access to information, leading to increased interest in teaching and experimentation. (Cradler and Bridgforth, 2002).
- requiring more collaboration and more communication with teachers, administrators and parents. (Cradler & Bridg forth, 2002).
- requiring more planning and energy.
- requiring the development of skills and knowledge of ICT and providing more time to engage with students, leading to greater productivity (Cradlers and Bridgforth, 2002).

ICT influences the pedagogies a lot. Strategies have become:

- more learner – centered, more cooperative and collaborative, more active learning
- based on greater access to information and sources of information (Paul, 2002).

Theoretical and empirical researches have proved that ICT has positive impact on teachers and their pedagogies, they use in learning environment. Although there were a few researches which concluded that using technology "massively undervalues the role of teachers" (Riel, 1998, P.1) but it would not be justified to say that teacher's role has undervalued. No doubt it has changed. It requires a greater range of skills and understandings. They are not just content expert, they are knowledge constructor too. Growing use of multimedia, internet, www and other virtual computer technology has influenced their style, attitude and skills towards their job. Cradler and Bridgforth (2002) says that use of ICT among teachers provide greater access to information lead to increased interest in teaching and experimentation and provide more time to engage with students lead to greater prodeuctivity.ICT does not undervalue the role of teachers, instead of it, it develops skills like collecting information, organizing information process information and communicating information. Lankshear and Snyder (2000, p.121) state that teachers need support in making use of new technologies to enhance their personal work before learning to use them in their teaching (Paul, 2002). Wider availability of best practices and best content of the subject which can be shared by means of ICT can foster better teaching.

Teachers at higher education level not only engage in transferring knowledge but in many other non teaching tasks too. These non teaching tasks are not only time consuming but greatly influence the real teaching job. Here ICTs help teachers to do their job with full potential.

Teacher's ICT Competence

By comprehensive review of literature, it has found that teachers' basic information and communication skills or competence are broadly investigated phenomena. Many studies focused on teacher's basic information and communication skills. Very few studies discussed teachers ICT competence in a broader meaning of term .While some other research articles were reviewing other researchers opinions about teachers ICT or digital competencies. Krumsvik (2008) defined the teacher digital competence as "the teacher's proficiency in using ICT in a professional context with good pedagogic didactic judgment and his or her awareness of its implications for learning strategies and the digital bildung of pupils". His digital literacy model for teachers based on basic ICT skills of teachers, pedagogic-didactics ICT competence, learning strategies, teacher's meta-cognition about their professional development and pedagogical content knowledge and digital bildung. Saba Riavskas and colleagues (2006) constructed a list of areas included in teacher ICT competencies after review of several researches and this list is given below

Basic ICT competencies, Technological ICT competencies, ICT Policy competencies, ICT competencies in the ethical area of ICT use.

Competencies of ICT integration into the teaching subject,Competencies of didactical methods based on the use of ICT, and Competencies of managing teaching/learning process working with ICT (Lakkala, Ilomaki and Kantosalo, 2011).

ICT Competency Standards for the Teachers

Now the question arises what are ICT competency standards for teachers. Many countries conducted researches and proposed ICT competencies standards while majority of them not only proposed, they set these standards as their targets for teachers. A number of ICT competencies are categorized as required ICT competencies and desired ICT competencies for teachers, keeping in view that as complex as societal and technical changes are, so dispersed is the teaching workforce, each one set these standards according to these changes. There competencies can be grouped as: Main application areas of ICT, ICT proficiency, Media

Literacy, Pedagogical competencies, Security and ethics.

Most desirable and required ICT competency among eight countries in a survey is to develop pedagogical skill for teachers. To achieve this competency following target were set.

1. Combine ICT skills with pedagogical ICT skills.
2. Focus on the pedagogical use of ICT and digital competence for all teaching personnel.
3. Use of ICT to learn and not learn to use ICT
4. Standard defines professional qualifications for teachers when implementing ICT in the educational process and self education.
5. Develop the ICT skills necessary for effective classroom use.
6. Integrate ICT in pedagogical practices. Little importance was given to the setting up of websites while creation of learning environment was an ambitious target and neither a desired or required competency for teachers (Anja, 2005).

UNESCO identified three overlapping and interdependent approaches that provide a base to develop a framework for setting targets or standards of ICT competence of teachers. These approaches are as:

- Technology literacy approach: Increase the technological uptake of students, citizens and the workforce by incorporating technology skills in curriculum.
- Knowledge deeping approach: Increase the ability of students, citizens and the workforce to use knowledge to add value to society and the economy by applying it to solve complex, real world problems.
- Knowledge creation approach: Increase the ability of students, citizens and the workforce to innovate, produce new knowledge and benefit from this new knowledge.

The standards of ICT competence set by UNESCO can be summarized as under:

The main components of education system are:

- Curriculum: A teacher should have basic knowledge of curriculum; have a sufficient grip over knowledge application and 21st century skills.
- Pedagogy: A teacher should be able to integrate technology, solve complex problems and should be aware of self-management.
- ICT: A teacher should be able to use basic tools, complex tools and pervasive tools (UNESCO, 2010).

Report on the localization process of the ICT competency standard for Rawandan Teachers by Ministry of Education Rawanda states that Fawe school teachers who (August, 2010) got training of ICT and had opportunity to apply in a ICT supported environment identified the teachers ICT competency standards as,

A good teacher is one who varies the methods to address all the needs of different students in the class s/he should be able to deliver the materials and the content should be precise. That teacher is a teacher who uses teaching aids to accommodate the different learning styles of the pupils. The use of ICT should focus on student centered methodology. On the teaching and learning materials the teacher uses in class, the teachers came in to assist the student to use that material in class. The teacher is transforming the use of ICT for student centered learning and practice. In short, teachers ICT competency standards are revolved around their basic knowle4dge about ICT and application of ICT.

Among the six elements of NICT strategy one was 'Apply ICT to strengthen the quality of teaching and educational management". It describes that to improve education in Pakistan, the needs of our teachers, head teachers and administrators must be addressed holistically. ICT can enhance teaching quality by supporting and reinforcing the use of innovative teaching practices. It focuses on instructional practices as help teachers understand and effectively use innovative instructional approaches and constructivist techniques, support them in applying a particular technology in a learner centered context by modeling lessons in live classroom situations that other educator can hear or observe via radio or through taped/broadcasted television modules.

Teachers Attitude Towards ICT

Albirini (2006) considered teachers attitudes as a major predictor of the use of new technologies in the educational setting. Teachers' attitude towards use of ICT is most important factor in successful integration of ICT in education. Attitude can be defined as positive or negative emotional reaction toward a specific situation or specific stimulus. When we talk about ICT, here this specific situation or stimulus is instruction communication technologies. What is teachers' response against these technologies at higher education level? Are they mentally prepared to accept it or not. There is a difference between to accept and to show willingness towards something. A number of researches were conducted to determine teacher attitudes towards use of ICT especially towards computers use. Harrison and Rainer (1992) opined that participants of their study, with negative computer attitudes were less skilled in computer

use and were therefore less likely to accept and adapt to technology than those with positive attitudes. Albirini (2004) found that teachers had positive attitudes towards technology use in education. Summers (1990) says that teachers existing attitudes, skills, and working habits will have great influence on their acceptance style of implementation and outcome of using computers for teaching. To what extent, teachers accept ICT tools for educational purposes, it depends upon their attitudes. This argument was supported by Naser, Leong and Fong (2010). They stated result of their research that teachers had a low level of ICT use for educational purposes, teachers hold positive attitude towards the use of ICT and a significant positive correlation between teachers level of ICT use and their attitudes towards the use of ICT. As Shaikh (2009) observed that teachers due to poor attitude doing with fear of a difficult learning process, lack of responsibility and ownership and other factors ignore their ICT training classes. It is a common observation that many teachers do not use ICFT during their lectures even though they have been trained in ICT skills (Shaikh. & Khoja. 2011).

The present study

The University of the Punjab is country's leading university, established in 1882 as examining and teaching body. It serves the educational needs of the country to a large extent, having 25,000 full time regular students and about 147,000 students in 434 affiliated colleges. It has 13 faculties with 10 constituent colleges, 63 departments, centers and institutes. It has about 650 permanent faculty members, involved in teaching and research (Wikipedia). It offers a broad range of study programs at the undergraduate, M.Sc, M.Phil and Ph.D levels. Infrastructure of the University is sufficient and supportive for the integration of ICT in instruction. Each faculty has its own computer lab and latest technologies like multimedia, electronic white board etc.

Aim of the study

The purpose of our study was to assess the current level of teachers ICT competence in university of the Punjab and teachers attitude towards the use of ICT.

The conceptual frame work of the investigation was based on the teachers self perception of their ICT competencies.

Research questions

Following research questions guided the development of the study:

1. To what extent is teachers in university of the Punjab are competent in use of ICT?

2. To what extent teachers have ICT competencies?
3. To what extent teachers are able to use ICT competencies supporting the learning process?
4. What is attitude of teachers towards the use of ICT in university of the Punjab?
5. To what extent do teachers pay attention to the ICT competencies at present?
6. What is relationship between teachers ICT competence and attitude towards its use?

To fulfill the recruitment of the design a teacher self rating scale was developed (STCICT) and attitude scale for teachers (TAICT) was adopted.

Method

Site and participants

Intended population of the study was teachers in all the 13 faculties of university of the Punjab. Two faculties from 13 faculties of the university were randomly selected: faculty of behavioral and social sciences and faculty of education. Convenience sample consisted of 30 respondents was used.

Instrumentation

In this study, a survey was employed to collect data. Two separate questionnaires were used for this purpose.

Scale for Teacher Competence in Information Communication Technologies (STCICT)

For developing this scale, 22 statements based on competencies and were derived from A Policy Analysis – Assessment Schemes for teachers ICT competence Blansket,(2005). Respondents were asked to rate their competencies on a five point Likert's scale. Numerical scores were assigned to responses as follows:

1. Highly insufficient
2. Insufficient
3. Undecided
4. Sufficient
5. Highly sufficient

These 22 statements were grouped under five competency areas

- Main application areas of ICT 5, 9, 10, 15
- ICT proficiency 2, 3, 13, 14, 16, 17, 21, 22
- Media literacy 1

- Pedagogical competencies 7, 11, 12, 18, 20
- Security and ethics 4, 6, 8, 19

Respondents had to state how much these competencies they have? They had to indicate the level of competence by using 5 point Likert scale.

Teachers Attitude Towards ICT (TAICT)

Second questionnaire of the study contained 15 statements and was designed as 5 point Likert scale. This scale was developed by Albirini (2006) and has been used in many researches for the same purpose. Numerical values were assigned from Strongly Disagree to Strongly Agree. Respondents were asked to indicate their responses by using five point Likert's scale. They had to rate the degree to which they were agree or disagree with the statement. Negative statements were reverse coded before analysis was carried out.

Data collection

Date collection was limited to teachers of both faculties of the University of the Punjab. Researcher collected the data by direct approach.

Data analysis

The data were collected and cleaned. Statistical package for social science (SPSS) was used to analyze the data. The descriptive statistics i.e. frequency, percentage, means and standard deviations was calculated. The Pearson's correlation coefficient was used to find the relationship between the current competence level of teachers and their attitude towards use of ICT.

Results

Results Related to Questionnaire 1

The results of descriptive analysis (mean, standard deviation and percentages) are presented in Table 1.

Table 1: Mean and Standard Deviation of Teachers' ICT Competence

Categories	Mean	SD
Main application areas of ICT	3.73	0.97
ICT proficiency Media	3.48	0.66
literacy	4.23	0.50
Pedagogical competencies	3.58	0.60

Security and ethics	3.74	0.63
Overall mean	3.59	0.54

Examination of the descriptive analysis indicates that the application areas of ICT had mean score (M = 3.73, SD=.97) which shows that respondents have sufficient competencies related to main application area of ICT. Mean score and standard deviation related to ICT proficiency competencies are (M = 3.48, SD =.66 This result shows that respondents are undecided about their ICT proficiency competencies. As regards to media literacy competency mean score was (M = 4.23,SD = .50). It reveals that respondents had sufficient grip over competencies related to media literacy. Most important group of competencies was pedagogical competencies. Result shows that respondents had sufficient grip over pedagogical competencies with mean score M= 3.58, SD = .60. The last group of competencies was related to security and ethics issues. Mean score was 3.7 and standard deviation was .63. These results show that respondent had sufficient command over these competencies too. The overall means and standard deviation shows that teachers in University of the Punjab had sufficient level of ICT use but not highly sufficient.

Results Related to Questionnaire 2

Table 2 reports the results of descriptive statistics (percentage, means and standard deviation) of teachers' attitude towards the use of ICT. As illustrated in table 2, teachers responded to 15 statements related to their attitude towards computer. The most frequent positive attitude towards computer was "I would like to learn more about computers". About 77% respondents answered that they are highly agree with the statement, with mean score (M = 4.76, SD = 0.43).

The second most positive attitudes were "Computers are a fast means of getting information" and "Computers would help me organize my work". 63% respondents indicated that they are highly agree with both statements, with mean score (M = 4.63, SD = .49).About 57% respondents opined that they are highly agree with the statements "Using computers would make subject matter more interesting" and "I like to use computers in teaching" with mean (M = 4.50,SD = .69). 53% respondents answered that the statements "Using computers is enjoyable" and "Computers do not scare me at all" with the mean (M = 4.4667) and standard deviation (SD = .62881). 50% respondents said that they are highly agree with the statements "Computers save time and effort" and "Computers can enhance student learning" with mean (M =4.40, SD = .72). About 47% of respondents were highly agree with the statement "Computers make me more

productive" with mean (M=4.36, SD = .66). 43% respondents highly agreed and 50% of the respondents opined that they agrede with the statement "Computers have proved to be effective learning tool". Overall mean shows that teachers have a positive attitude towards use of ICT for educational purposes.

Table 2: Mean and Standard Deviation of Teachers Attitude towards Use of Computer

S.#	Statements	Mean	SD
1	Computers would help me organize my work	4.63	0.49
2	Using computer would make subject matter more interesting	4.50	0.68
3	Computer save time and effort	4.40	0.72
4	Using computers is enjoyable	4.47	0.63
5	Computers make me much more productive	4.37	0.67
6	Teaching with computers offers real advantages	4.30	0.65
7	Computers Have proved to be effective learning tools	4.33	0.71
8	Computer can enhance students learning	4.33	0.84
9	I would rather do things by hand than with a computer	2.17	0.99
10	Computes will improve education	4.30	0.53
11	Computer do not scare me at all	4.27	1.01
12	I do not like talking with others about computes	2.53	1.57
13	I like to use computers in teaching	4.47	0.82
14	Computers are a fast means of getting information	4.60	0.56
15	I would like to learn more about computers	4.77	0.43
	Overall Mean	4.16	.39

Results Related to Correlation

To assess the relationship between the level of ICT use and teachers' attitude towards the use of computers, Pearson correlation coefficients were used. Table 3 presents the correlation results. It is examined that when attitude was computed separately against the five categories of ICT competence and later when overall results of both variables were computed against each other, no significant correlation was found.

Table 3: Correlation between teacher's attitude and their ICT competencies

	Main area applications	ICT proficiency	Media literacy	Pedagogical competencies	Security and ethics	overall
Attitude	0.170	.148	-0.024	-142	-0.036	0.080

Discussion

The findings show that teachers' current ICT competence varies by the respondents. Majority of the teachers had an average level of ICT competence. Mostly teachers in University of the Punjab tended to use ICT applications and resources for education purposes like Internet, PowerPoint presentations, Multimedia, word process etc.

The highest mean was of category 3 related to media literacy including information handling. This show almost all of the respondents have sufficient competencies related to information handling. So their current level of ICT competence or ICT use is sufficient. Second most sufficient area is of security and ethics. Respondents are well aware of security and ethics issue. Pedagogical competencies are at number 3 in this ranking. This result is in compliance with the findings of Al-Zaidiyeen, Lai & Fook (2010) who conducted a survey in 2008 to assess level of ICT use and teachers' attitude towards use of ICT in Jordanian rural secondary schools. The result shows that teachers in University of the Punjab have varied level of ICT use which can be depicted by their ICT competence in various categories of ICT competencies contrary to the Al-Zaidiyeen, Lai & Fook (2010). Overall mean shows that ICT competence of level of ICT use among teachers in University of the Punjab is sufficient. Teachers' attitude is an important factor in integrating ICTs for educational purposes. By teachers attitude we can determine the extent to which technologies are used in the process of teaching and learning. The analysis of the data shows that teachers in University of the Punjab have a positive attitude towards use of ICT for educational purposes. Majority of them is interested to learn more about computers and they opined that ICTs have made their job easier than before. This finding is consistent with other researches (Albirini, 2004; Abu-Simak, 2006; Al-Zaidiyeen, Lai and Fook, 2010).

The findings of this study indicated that teachers' attitudes towards the use of computers had no significant relation with their level of ICT use or ICT competence for educational purpose. In other words the correlation finding revealed that there was no correlation between teachers' ICT competence and their attitude. It was observed that some teachers use ICTs for educational purposes at a sufficient level but their attitude towards use of ICT is negative. On

the other hand, some teachers having positive attitude towards use of ICT, do not use ICTs for educational purposes at sufficient level. Behind this fact, there might be many reasons like faculty ICT capacity, lack of ICT training etc.

Research findings are quite different from findings of Al-Zaidiyeen, Mei & Fook (2010), Albirini (2004) and Isleem (2003). Results of their researches indicated a significant relationship between teachers ICT's use and their attitude. Further their results showed that teachers holds negative attitude towards the use of ICT, as a result they are less likely to contribute effectively to the utilization of ICT for educational purposes.

However, the study contributed to the researches regarding the utilization of ICT for educational purposes in developing countries. In depth researches to find out what are the factors behind research results should be conducted in future. The study concluded that basic and advanced level ICT training is necessary for the teachers in the university to improve their ICT competence & promote their attitude towards use of it.

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