

Effective Factors on Information and Communication Technology Usage by University Teachers; a Case Study of Kharazmi University

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Abstract

The purpose of this study was to investigate the factors effecting Information and Communication Technology (ICT) usage in Kharazmi University in Iran and provide insight into the teachers' points of views. Among 300 university teachers, 97 were selected randomly to answer the questionnaire. A researcher-made Likert-type questionnaire was developed using the modules of the ICT Foundation. For comparison and ranking of ICT usage, the Chi square formula and one-way analysis of variance were used. There was significant similarity among the teachers' attitudes in 7 departments about the effects of ICT to use in teaching-learning process. There was no significant difference between teachers' view points about their enthusiasm of professional use of ICT and to integrate technology in pedagogically sound ways in all faculties. The main priority of Kharazmi University according to the teachers was related to the teachers' attitude to empower ICT approaches through teaching and learning processes.

Keywords: Information and Communication Technology, Kharazmi University, Teachers attitudes.

Introduction

Information and Communication Technology (ICT) can be defined as technology which consists of the gathering, organizing, storing, and spreading information such as sound, image, text, or numbers computer and telecommunication devices. From another perspective, ICT also refers to a computer and internet based technology for the purpose of informational and communicational services to the large spectrum of users (wen, 1999).

ICT gives great solutions for today's educational and research problems. In developing countries the main problem of educational systems is related to increasing the quantity of services while in developed nations the main focus is on quality. Universities and scientific institutions across the globe try to improve both the quantity and quality of education using modern technology (Chizari and et al. 2003). Madadi & colleagues (2011) noted that "the level of usage of ICT has a positive and meaningful relationship with the degree of familiarity

with ICT, educational degree, and type of employment. Therefore with 99 percent confidence it can be said that the degree of usage of information and communication technology is directly proportionate to the degree of familiarity with ICT, educational degree, and type of employment".

The Integration of ICT and Teaching-learning process

Most educational systems have a vision for the integration of ICT in the teaching and learning process. However, some strategies need to be redefined in order to have an effective implement of ICT in the classrooms. According to Mishra & Koehler (2005) in recent years, researchers reported that effective ICT integration requires teachers to acquire knowledge of technology, content, pedagogy and the intersection of these, known as TPACK (Archambault, & Crippen, 2009). The TPACK model was developed by Koehler & Mishra (2006), derived from Shulman's Pedagogical Content Knowledge (PCK) model. According to Shulman (1986) pedagogical content knowledge (PCK) is a "specific category of knowledge which goes beyond knowledge of subject matter per se to the dimension of subject matter knowledge for teaching". As for TPACK model, Technology Knowledge (TK) covers teachers' knowledge of technology tools to be used in teaching (Koehler et al., 2007).

Pedagogy Knowledge (PK) is defined as knowledge of applying strategies to deliver the instruction which includes teaching approaches for assessing individual's learning needs, performance and strategies to present the content (Koehler et al., 2007). Content Knowledge (CK) is a subject matter knowledge in which teachers specialize. The intersection between three domains of knowledge produces Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK) and Technological Content Knowledge (TCK). The PCK domain refers to knowledge of integrating effective teaching strategies with the content knowledge (Koehler & Mishra, 2005). TPK involves teachers' understanding of using technology with suitable teaching strategies. The heart of suggested model is Technological Pedagogical and Content Knowledge (TPACK), which is described as knowing how to integrate technology within the subject matter in pedagogically sound ways (Koehler & Mishra, 2005).

How much does the integration of ICT and educational process develop educational quality in Iranian universities? Teachers should have a professional approach towards ICT use in their teaching method and for integrating technology in pedagogically sound ways. Nordin, Davis & Ariffin (2013) examined the needs for field experience of Malaysian teachers before and after using ICT in the classroom. They asserted on the effects of teachers' pedagogical background to use ICT.

Iranian universities must fulfill the expectations of new trends to use ICT, which is characterized by being more open, flexible, and competitive in their functions, and they must promote the use of this to refer to the institutional missions. They must respond to students' needs, begin to think globally and to create new alliances, design new programs, restructure their conceptions on the characteristics of learning environments, rebuild their conceptions on the value of knowledge, and develop internal policies to encourage innovation,

experimentation, and teachers' creativity. It is asserted by several researchers that the new functions and competences required lead us to consider their formative needs: "teachers point out their need for being trained in the use of ICT in new teaching methods and in the assessment of learning".

Biglari & Agahi (2010) pointed out the effective factors on ICT usage in Razi University in Iran. According to their findings teachers' attitudes toward information and communication technology, related skills, and the number of published papers in web based journals and conferences are evidence of its applications. So, the effects of factors which make the teachers' abilities in professional use of ICT during teaching-learning process and their attitude do not sound good.

Upcoming Trends to the Use of ICT in Universities

Technology makes the learning environment more attractive and applicable. Meanwhile, the ability to find, assess and use information effectively is now widely recognized as an essential competence for effective participation in contemporary society (Corrall, 2008). Gardner, (1997) state that "Since human beings have different understanding about the world, we should provide the students with full information about internship, project and technology in order to make themselves more compatible with teaching system" (Van Brakel & Chisenga, 2003).

There are upcoming trends in Iran (as some other countries in Asia) to the use of ICT as a technology which has positive effects on educational systems quality promotion. Advantages of ICT in the teaching-learning process referred to Toure (2009) include:

1. Revising & supplying of items: Submission of ideas, processes and activities which are difficult and/or impossible without technology.

2. Access to information: Learners may find easy access to some information through different technologies such as internet which in the past was not possible.

3. More variety and changes: Benefiting from technology creates a fundamental change in learning process. Some of the mentioned changes are easy learning process, lack of time & place limitations, accelerating of time and data analysis, involvement of learners.

4. Cooperation: By cooperation in group & scientific activities of learners, there will be a humanistic and group efforts for better meaning and a conceptual learning.

Some studies highlight how the teaching attitude play an essential role when teaching curricular contents through ICT (Ertmer, 2005; Goos, et al, 2003). Shaft, Sharfman & Wu (2004) illustrated that the beliefs and attitude are concerned as an only way to predict behaviors related to integration of ICT in the classrooms. Russell (et al. 2003) affirmed that in this way, use and attitude would be closely related. They denoted: "if teachers' use of technology changed, then their beliefs about the technology might change" (Ibid, 298).

Many research works have emphasized the study of teachers' attitudes towards the use of new technologies in the classroom. The results show very positive attitudes and the common acceptance that their use will be soon completely expanded among teachers (Cure, Ozdener, 2008; Karagiorgim & Charalambous,2006). It seems to be that an younger age is a highly

relevant factor for the teachers who have a positive attitude towards the incorporation of ICT because those who are young have more teaching experience with ICT and therefore, they feel more involved with their use than older teachers (Shaunessy, 2007). Askar & Olkun (2005) come to the conclusion that both teachers' age and the period of use of ICT affect the quality of teaching. There are the findings of the study indicated a very strong positive correlation between teachers' attitudes toward ICT in education and their perceptions of computer attributes (Zhou et.al, 2010).

Using ICT during the teaching-learning process is a new approach in some environment and it helps students not only in recognition but also in making knowledge permanent. Usage of ICT in more approachable methods needed scrutinizing teachers' abilities in using facilities in proper style. Thus, it increases the quality of instruction. Meanwhile, the effects of attitude and age on using ICT could not be neglected.

Methodology

To investigate the ICT usage in different faculties of Kharazmi University, a questionnaire was distributed among all teachers regardless of their academic levels and 97 of them from 7 faculties participated in which is postulated in the table 1. There was a questionnaire (with 25 questions) which was made and sent to some university professors and related specialists, and then the questionnaire was corrected based on their proposals. The final questionnaire was valid with a Cronbach's alpha of 86%. The scale of questions was a 5-point Likert-type scale (from 5= strongly agree to 1=strongly disagree).

Table 1

Sample of teachers participated from different faculties

Faculty	N
Biology and Chemistry	14
Education and Psychology	14
Persian and foreign languages	15
Sport sciences	15
Engineering	13
Math and Computer	13
Geography	13

Surveying method used for the present study: descriptive statistical analyses were done for the Likert-type questions (i.e. frequency analysis, measures of central tendency and dispersion) and final data was scrutinized using Factorial Analysis (ANOVA) and Chi Square tests.

Main questions

- How do teachers describe their professional abilities to use of ICT during teaching-learning processes?
- How do teachers describe their attitude to use of ICT during teaching-learning

processes?

- What is the relation between teachers' attitudes and their ages?

Results and Discussion

Table 2

Significance of teachers' points of views on describing their professional use of ICT

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	263.507 ^a	189	.199
Likelihood Ratio	200.720	189	.982
N of Valid Cases	147		

a. 288 cells (100.0%) have expected count less than 5.
The minimum expected count is .02.

Symmetric Measures ^c			
		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.870	.199
N of Valid Cases		147	

a. Not assuming the null hypothesis.

As shown in table 2, there was no significant difference among the teachers' viewpoints on their efforts to use ICT professionally. As mentioned before, It was a 5-point Likert-type scale, where 5 (strongly agree) represents the maximum score of the scale and 1 (strongly disagree) represents the minimum score. As shown in figure 1, the count of teacher assertions on ICT professional usage in most faculties (refer to lykert-typed questionnaire) is less than 3 which means medium score devoted to the teachers' approach to use ICT. However the quality of ICT usage in each faculty could be approachable separately.

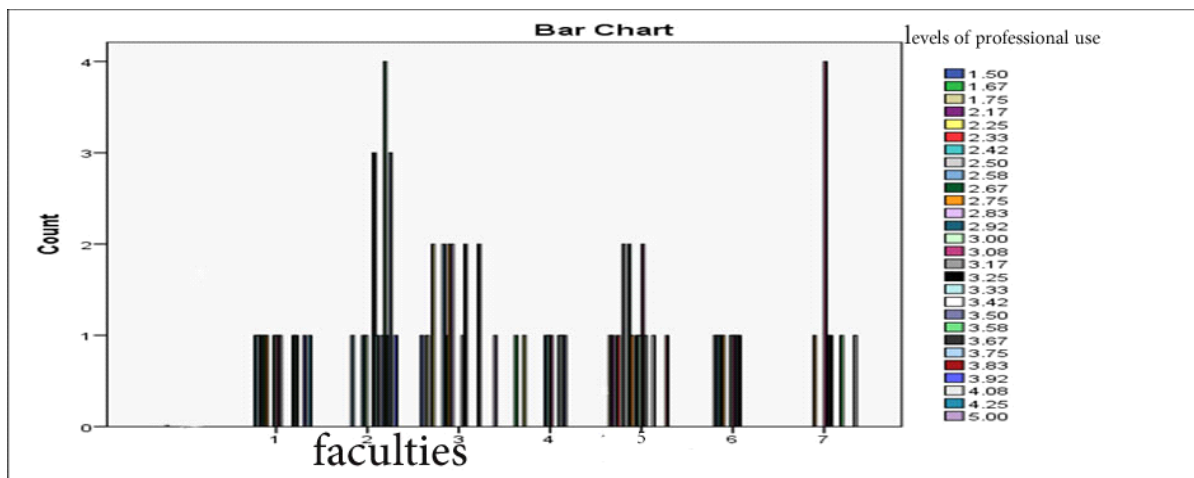


Figure 1. Counts on level of ICT professional usage based on teachers' views

Table 3

Significance of teachers' attitude to the use of ICT

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Faculty and * attitude	100	90.7%	15	9.3%	110	100.0%

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	224.194 ^a	189	.041
Likelihood Ratio	177.527	189	.715
N of Valid Cases	120		

Referring to the findings presented in the table 3, we found that the range of scores devoted to teachers' attitude on the effectiveness of ICT usage in educational process is significantly the same (Approx. sig .41, DF 189, P<0.005). The next figure (figure 2) represents the level of maximum scores. As shown, there was no meaningful difference among the teachers' attitude in all faculties. The ranges of teachers' attitude to ICT use in most faculties (refer to lykert-typed questionnaire) was less than 3 showing medium agreement to use ICT.

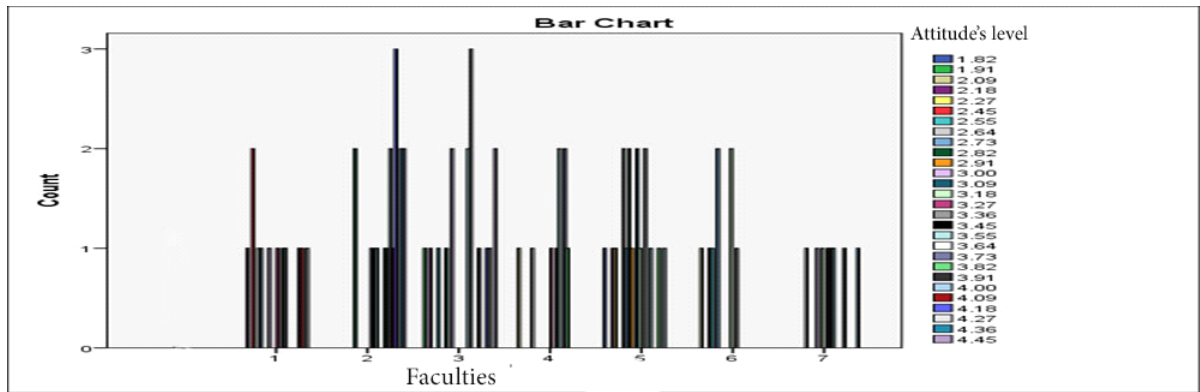


Figure 2. Counts of attitude levels in different faculties

Table 4

Relation among the teachers' attitude on use of ICT and age

ANOVA ^a						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.070	1	.070	.147	.703 ^b
	Residual	40.687	85	.479		
	Total	40.757	86			
a. Dependent Variable: attitude						
b. Predictors: (Constant), age						

Referring to the findings presented in Table 4, it is revealed that at the 0.05 level of significance (Approx. sig .703, F 147, $P < 0.001$) there is not a significant relation among the teachers' attitude on use of ICT and age. The range of teachers' ages that participated in research is from 25 to 65 illustrated in figure 3.

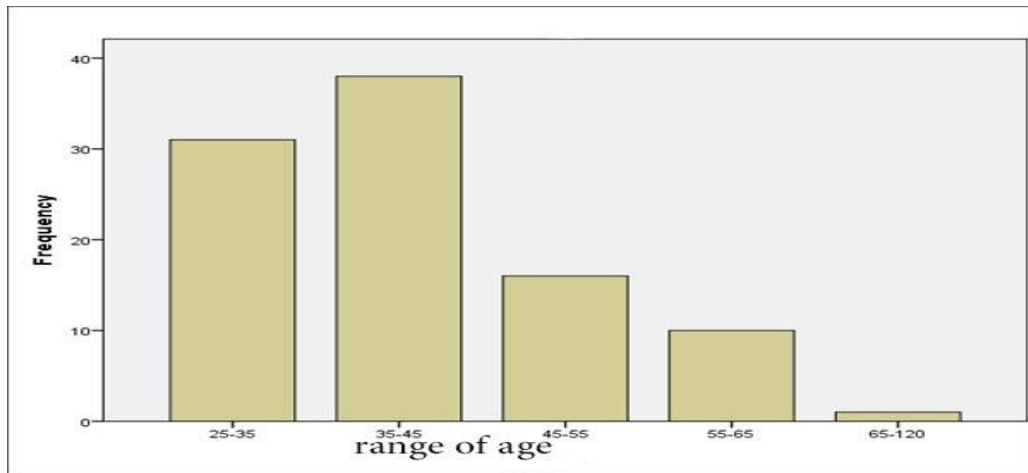


Figure 3. Range of the teachers' age participated in research

This finding adds to the previous finding that the teachers' attitude to the use of ICT regardless of their age is less than the medium level. The level of familiarity with and usage of ICT in organizational activities can be an appropriate indicator for recognizing the level of development of ICT in educational organizations and structures within a country.

According to Koehler & Mishra (2005) professional use of ICT is undergrounded in the pedagogical backup to use it. The results of this study showed that most teachers in faculties of Kharazmi University have the same views on their lower level of professional usage of ICT. We found no significant difference among the teacher's points of views on their efforts to use ICT professionally in their faculties. The finding of research in this point was consistent with findings of Biglari & Agahi (2010). It is also reasonable that qualified teachers with pedagogical background use ICT more professionally as affirmed by Nordin, Davis and Ariffin (2013). It is desired for the teachers as much as the other scientific members of universities to promote their scientific background and scope of knowledge at the same way to use the teaching facilities and ICT devices.

We also found that the teachers' attitude on ICT use was meaningfully less than the medium level. This finding adds to the previous finding that the teachers' attitude to the use of ICT regardless of their different range of age was less than medium (the medium proposed number according to Likert scale is 3). This finding was consistent with studies by Ertmer, 2005; Goos, et al. 2003 and Shaft, Sharfman & Wu (2004) whom asserted that attitude as the only way to predict behaviors related with the integration of ICT in the classrooms.

According to Zhang (2005) older employees are less confident in using the internet in compared with their younger colleagues. Madadi, Irvani & Nooghabi (2011) on the basis of their findings noted that there was a positive relationship between the level of ICT usage and

field of education and academic ranking, and adverse relationship with work experience, and there was no correlation with age. We found no relationship between the attitude of ICT usage and teachers' age. The teachers from different ranges of ages should promote their ability to use ICT and have a suitable approach to use it during the teaching and learning process.

In conclusion, the main factors that affect ICT use in Kharazmi University are grounded in the teachers' attitude regardless of their age. Therefore, in order to improve ICT usage teachers' attitude and their professional applications of ICT should be modified.

References

- Archambault, L. and Crippen, K. (2009): Examining TPACK among K-12 online distance educators in the United States. *Contemporary Issues in Technology and Teacher Education*, 9 (1), 71–88.
- Askar, P., & Olkun, S. (2005). The use of ICT in schools based on PISA 2003 data. *Eurasian Journal of Educational Research*, 19 (5), 15 – 34
- Biglari, E., Agahi, H. (2010). A study on factors affecting application of Information and Communication Technology (ICT) by faculty members of Razi University Kermanshah. *Iranian Research Institute for Science and Technology* 26 (1), 29-44. Retrieved from <http://jist.irandoc.ac.ir>
- Chizari, M., Movahed, H. & Lindner, J.R. (2003). The role of internet in educational activities of graduate students at Tehran University; College of Agriculture, Proceedings of the 19th Annual Conference Raleigh, North Carolina, USA/, April 8- 12, 126-134, Retrieved from <http://www/aiaee/org/2003/chizari126-234>
- Corrall, Sh. (2008). Information literacy strategy development in higher education: An exploratory study. *International Journal of Information Management*, 28 (1), 26–37. Retrieved from www.elsevier.com/
- Cure F. Ozdener N. (2008) Teacher's success in using ICT and their attitude towards ICT.H. *U. Journal of Education*, 34 (3), 41-53.
- Goos M., Galbraith P., Renshaw, P., & Geiger, V. (2003). Perspectives on technology mediated learning in secondary school mathematics classrooms. *Journal of Mathematical Behavior*, 22 (1), 73-89.
- Karagiorgi, Y., Charalambous, K. (2006). ICT in-service training and school practices: in search for the impact. *Journal of Education for Teaching*, 32 (4), 395- 411
- Koehler, M. J., Mishra, P. (2005) what happens when teachers design educational technology? the development of technological pedagogical content knowledge. *Journal of Educational Computing Research*, 32 (2), 131–152.
- Koehler, M.J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy, & technology. *Computers and Education*, 49 (3), 740-762.
- Madadi H., Irvani H., Nooghabi S. (2011). Factors have effect on Familiarity and Usage of

- Information and Communication Technology. *Procedia Social and Behavioral Sciences* 15 (2011) 3625–3632. Retrieved from www.sciencedirect.com
- Nordin H., Davis N., Ariffin T.F (2013). A case study of secondary pre-service teachers' technological pedagogical and content knowledge mastery level. 13th International Educational Technology Conference. *Procedia - social and behavioral sciences* 103 (2013)1 – 9. Retrieved from www.sciencedirect.com
- Russell, M., Bebell, D., O'Dwyer, L., & O'Conner. (2003). 'Examining teacher technology use: implication for pre-service and in-service teacher preparation. *Journal of Teacher Education*, 54(4), 297- 310
- Shaft, T., Sharfman, M & Wu, W (2004). Reliability assessment of the attitude towards computers instrument (ATCI). *Computers in Human Behavior*, 20(65), 116-118
- Shaunessy, E. (2007). Attitudes toward information technology of teachers of the gifted implications for gifted education. *Gifted Child Quarterly*, 2 (51), 119-135
- Toure, K. (2009). Appropriating technologies and making them work for you in teaching and learning: depth is essential. In T. Karsenti (Ed.), *Pedagogical use of ICT: Teaching and Reflecting Strategies* (pp. 94-110). Ottawa: IDRC.
- Van Brakel, P. A., & Chisenga, J. (2003). Impact of ICT-based distance learning: the African story. *The Electronic Library*, 21(5): 476-486
- Wen, M. (1999). Factor related to use of internet by North Carolina cooperative extension field faculty. Unpublished doctoral dissertation University of North Carolina State, Raleigh/ USA/
- Zhang, Y. (2005). Age, gender, and Internet attitudes among employees in the business world, *Computers in Human Behavior* 21(1), 1-10
- Zhou Q., Zhao Y., Hu J., Liu Y, Xing L. (2010) Pre-service chemistry teachers' attitude toward ICT in Xi'an. *Procedia social and behavioral sciences* 9 (2010), 1407–1414. Retrieved from www.sciencedirect.com