Analysing the Opportunities and Challenges to Use of Information and Communication Technology Tools in Teaching-Learning Process

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Abstract

The research aims at the evaluation of ICT use in teaching-learning process to the students of Isfahan elementary schools. The method of this research is descriptive- surveying. The statistical population of the study was all teachers of Isfahan elementary schools. The sample size was determined 350 persons that selected through cluster sampling method. The research tools were researcher made questioner in use of ICT in teaching-learning process which has been used after confirming its reliability and validity. The results showed that the use and the application level of ICT in teaching-learning process has a meaningful relationship with ICT equipment in schools, their Literacy and information skills (their e-readiness), and the teachers' attitude to use ICT in teaching-learning process. Also, the challenges of ICT tools use have been specified in 5 levels of organizational, management, equipment-financial, attitudinal, and educational at schools.

Keywords

Opportunities, Challenges, Information Communication Technology, Teaching, learning, Teachers.

Introduction

In last century that is passing time from industrial era to communication and information era, education have been considerably changed qualitatively and quantitatively compared to the last eras, so that with entering the ICT to education field, some fundamental changes emerged in educational methods and ways. ICT has played an important role in these changes and apportioning the new educational system with modern world, through changing the traditional method of training to electronic training. With the presence of educational technology in schools, the traditional teacher-based method of training has been nearly changed to communicational and student-based training. With using the educational technology in teaching- learning process, many advantages and opportunities, making the use of education from E-training necessary, have been developed for new education. Specially in Iran, in which the educational system is more traditional and memory-based, and less creative, and the learning is not based on participation and involvement of the student with educational matters, the need for use of educational technologies is more felt. So durability of educational system in today informational society depends on self-updating, and abandoning

the traditional method and ways to solve the modern society issues, so the use of education from ICT is necessary both for solving internal issues of self and solving the society problems. The important point is that there is a mutual relationship between education, and ICT, that is the presence and application of ICT in education lead to the better efficiency of educational system and being qualified the learning at schools on one hand, and promoting and spreading the ICT among learners, and finally all of the society members, and provides the required contexts and bases for electronic government, city, etc. implementation on the other hand. (Zarghami, 2007)

Recognizing and analysing the current situation, the efficient factors, and the impediments of ICT application in education seem necessary regarding the mentioned necessities of ICT in education; because, the prerequisite of any programming, targeting, and policy making to execute a plan is the recognition of existing and required bases and conditions in desired area for plan execution. Although ICT is relatively used in educational process of elementary schools of the country, but these educational facilities are not used appropriately in training process due to some reasons, and often the traditional and teacher-based methods of training are being used. so, definitely , the usage of electronic training technologies in education faced with many obstacles and challenges, proper and subtle recognition   of which deemed necessary to remove ;therefore, the research objective is the evaluation of ICT tools in `teaching-learning process, and recognizing the challenges of using them in elementary schools of Isfahan as a small part of the country education.

Literature Review

Some researchers have been conducted regarding the usage of ICT in Iran and abroad, each of them have noted to some aspects of ICT usage in Education and learning. For example Khoshkenar (2004) has studied about the level of teacher's access to ICT (computer and internet); according to results, the teachers' access to computers and the Internet is 6.25% and 1.25% respectively, and the students' access is% 6.08 and 1.3% respectively, this amount is very lower compared to most developing countries of the world, even though the adjacent countries.

Suleimani (2011) in a research titled" the relationship between ICT usage and Educational and research performance of faculty members of Ferdowsi University of Mashhad in 1998-2009" Concluded that there is a significant relationship between faculty members of Ferdowsi University of Mashhad using of ICT and their education and research performance.

Nurozi (2008) in their research entitled "ranking application methods of IT in teaching-learning process of schools" suggested that the proper using of ICT for public period is more based on non-internet application such as computer games, and enjoying the tutorial multimedia soft wares and simulations, while the proper use of ICT for secondary and vocational schools and higher education is more base on internet application specially group researching can be done with internet tools or the like.

Samari and Atashak (2009), in their previous research about using the educational technologies by teachers studied about the results of US president report, in which they presented nine successful usage of technology in classroom, and some of the results include: progression of test scores, lowering repetition rate, reducing the absence of students from the classroom, reducing dropouts, increase graduation rates, all-round development of incentives and growth of employment.

Nasiri and Taghi poor Zahir (2009), in a research titled "the study of obstacles of using ICT in education, and presenting a model in this regard" , raised the obstacles as follow: a-organizational and management obstacles(lack of written policy on ICT, negative attitude of managers, lack of planning, lack of laws and regulations) Structural requirements (educational, executive and administrative planning with centralized system and high formalization and complexity, the lack of participative leadership, etc.), the lack of incentives for the using of ICT among managers and staff, lack of control, lack of appropriate culture-making and preparation, lack of funding ,and so on. Shahbaz, Zamani and Nasr esfahani (2011) in a paper entitled" the study of adoption challenges and usage of ICT among secondary school teachers based on obstacles of ICT usage have presented the following obstacles and barriers in order of importance: the obstacles of ICT usage in School curricula related to education and preparation of some programs for the development of professional skills of teachers, administrative obstacles such as lack of supervision of managers in the implementation of ICT plan, non-clearing of decisions , views and goals of the entering technology to the organization…etc. Then the third set of the obstacles include: the organizational obstacles such as: lack of motivation incentive, lack of coordination of teachers with each other, etc.

The last obstacle to the application of ICT is related to financial and material equipment of schools and teachers. Also, Paraskeva, Bouta and Papaianni (2008) in a study about a relationship between the unique characteristic of the school teachers of Greek, identifying the application and development of computer technology, concluded that the previous experience and training of the teachers in using these technologies, is the biggest factor in creating positive attitudes to use it. Also the creating of appropriate software for each lesson can be effective in increasing the application of computers. Snoeynk and Ertmer (2000) according to their research have divided the obstacles of using computer and educational technologies in tow internal and external categories. The related equipment and facilities are some parts of external obstacles, and the skills needed to enjoy ICT are related to internal ones. Peansupap and Walker (2005) in their research about the effective factors on adoption and the usage of ICT in the organizations of Australia concluded that there are two factors among the users are considered as the main obstacles of ICT usage: the negative feeling of ICT users in the organization and the sense of disability in using these technologies.

Yavuz (2005) in a research regarding the teachers imagination of the new educational technologies, has found 5 factors the community of Turkey teachers respectively include: Non-application of ICT tools in education (15%), The use of technology in education (14%),

the impacts of technology in education (12/5%), the manner of using technology tools (11/15%), and evaluate technological tools (7/67%). These factors altogether explained 60% of the total variance. Glazer and Hannafin (2008), studying the factors effecting on the teachers engaging in technologies using conclude that those teachers who use technology in teaching, have more engaging than their colleagues. Keengwe, Kidd and Blankston (2006) mentioned the organizational, management, and educational obstacles, the equipment and financial facilities as the most effective factors on the ICT adoption process in higher education; In addition, Grabe & Grabe (2009) noted that Non-coercion in application of ICT and lack of awareness of the benefits of using ICT is the main obstacle for its application.

Research Method

The research method is descriptive-survey, and   applied in terms of objective. The statistical population of the research was all the teachers of Esfahan elementary schools. The sample size was specified as 350 persons according to Kokran formula selected by cluster sampling to respond the questions in questionnaire. The data collection tools was researcher made questionnaire of the use of ICT in teaching-learning process planned in several independent but coherent parts after consulting with the experts and academics in the field of education, then presented to respondent to estimate their ideas and opinions. The above mentioned questionnaire was in closed and multiple choice and the answers of which was arranged according to 5 choice scale of Likert to (very low-low, medium, high, very high) or (very poor, poor, average, good and excellent) respectively, and the scores of (1-5) apportioned to them so that as (1) was very low, (5) was very high. The questions of the questionnaire were prepared in 4 parts: 1. Teachers use of ICT in equipment teaching-learning process, Manifestations of ICT in schools, Information and skills in the use of ICT by teachers, and teachers' attitudes towards the use of ICT in schools. Also, in the final section of the questionnaire used to evaluate the challenges of ICT in the education process with a few open-ended questions, the teachers were asked to mention the existing barriers that have faced their usage of ICT with challenge. A logical method, which by itself includes tow appearance and content methods, was used to determine the validity so that at first the appearance validity of the questions was considered, then polled from the experts, specialist, and the faculties in the field of education and educational technology, finally the questions were revised and amended according to amendment advices. Moreover, the perpetuity of the questionnaire was evaluated using Cranach's alpha coefficient which is considered as one method of measuring the internal consistency; so that Cranach's alpha coefficient was calculated separately for each category of the questionnaire items, and those questions which damaged the perpetuity of test were amended or deleted.

The results of the assessment of the questionnaire items reliability have been shown in Table 1. Since Cranach's alpha coefficient of all category items were estimated higher than 0.8, it can be said that the questionnaire had acceptable perpetuity.

Table1.Alpha coefficient for questionnaire items

Variable	Alpha Coefficient
Teachers use of ICT	84٪
The equipment, facilities and manifestation ICT in schools.	81٪
Information and skills of teachers in the use of ICT	87٪

Teachers' attitudes towards the use of ICT	84٪

Data analysis was conducted through quantitative statistical methods using SPSS statistical software in descriptive and inferential level. With respect to the levels of variables assessment, first we conducted the descriptive data analysis using the mean and abundance indices. Then we used one- sample t-test and independent statistical techniques, Pearson correlation coefficient, and multivariate regression analysis to inferential analysis of data to test the hypotheses.

Research Result

According to descriptive analysis of questionnaires estimated results, it was found that more than 51% of respondent teachers were female, and less than 49% of them were male. The slight difference was shown in selecting most of female samples, was due to more sample size of females in research statistical population. According to the results of processing the questions of questionnaire, nearly 77% of the respondents were of middle ages that are in the age range of 35-50 years, and nearly 33% of the respondents were at the age range of 20-30 years, and more than 50 years.

Table 2. One-sample t-test results of equipment and manifestations of ICT and teachers' use

Variable	Mean	t	Significance level	The mean difference
Equipment and manifestation of ICT at schools	3.301	11.851	.000	.301
The teachers' use of ICT	2.821	-4.980	.000	-.18000

The results of table 2 shows that the mean score of the equipment and manifestation of ICT at schools of the studied area is (3.301), and due to its significant difference with test value (3) and significance level (0.000) less than (0.05), we can claim that it is higher than the mean level and nearly in an acceptable level. The mean of The teachers' use of ICT in the teaching-learning process (2.82) is less than the test value (3), and the significance level of test (0.000) which is less than (0.05) has shown the negative significance distance which is less than the test value.

Table 3. Pearson correlation test between the equipment and the manifestations of ICT use in schools and the teachers' use

the teachers' use of ICT	variables		
.483**	Pearson correlation	Pearson	the equipment and the manifestations of ICT use in schools
.006	Significance level		
350	Number		

The results of table 3 shows that, according to Pearson correlation test, there is a relationship with intensity of (0.48) between the equipment and the manifestations of ICT use in schools and the teachers' use of ICT in the teaching-learning process, and according to this value we can claim that there is a positive correlation between the two variables. The relation means that with the increasing the equipment and manifestation of ICT equipment in schools, the use of ICT in the teaching-learning process would be increased, and vice versa.

Table 4. One-sample t-test of knowledge and skills of teachers in the use of ICT

Variable	Mean	t	Significance level	The mean difference
knowledge and skills of teachers in the use of ICT	3.20	6.707	.000	.20743

The results of table 4 shows that the mean score of knowledge and skills of teachers in the use of ICT in the teaching-learning process is nearly 3.21 which has the significant distance with test value(3), and because the significance level of the test (0.000) is less than the accepted significance level (0.05), we can claim the mean of knowledge and skills of teachers in the use of ICT in the teaching-learning process is higher than the mean level(3), which is somehow desirable.

Table 5. Pearson correlation test between teachers' knowledge and skills in working with ICT and the teachers 'use

the teachers' use of ICT	variables		
.537**	Pearson correlation	Pearson	The teachers' knowledge and skills in use of ICT
.020	Significance level		
350	Number		

The information of table 5 shows that there is a relation with the intensity of (0.54) between two variables of The teachers' knowledge and skills in use of ICT in the teaching-learning process and the teachers' use of ICT in the teaching-learning process, and the value shows the positive correlation between two mentioned variables. The relation means that with increasing knowledge and skills of teachers in the use of ICT, the teachers' use of ICT in the teaching-learning process would be increased, and vice versa.

Table 6. One-sample t-test of teachers' attitudes towards the use of ICT

Variable	Mean	t	Significance level	The mean difference
teachers' attitudes towards the use of ICT	3.594	24.454	.000	-.18000

Test Value = 3

The information of table 6 shows that the score of teachers' attitudes towards the use of ICT in the teaching-learning process is (3.59), which has the significant difference with test value (3). According to the significance level of the test (0.000) which is less than acceptable significance level (0.05), it is found that teachers' attitudes towards the use of ICT in the teaching-learning process is positive.

Table 7. Pearson correlation test between teachers' attitudes towards the use of ICT and the teachers' use

the teachers' use of ICT	variables		
.612**	Pearson correlation	Pearson	The teachers' attitude towards ICT in the teaching-learning process
.030	Significance level		
350	Number		

According to the results of table 7 which has shown the relationship and correlation between two variables of between teachers' attitudes towards the use of ICT and the teachers' use of ICT in the teaching-learning process, the intensity of the relation has been estimated (0.612) through Pearson correlation test, which shows the strong positive correlation between the two variables. The relation means that with increasing the positive attitude towards the use of ICT, the teachers' use of ICT in the teaching-learning process would be increased and vice versa.

Table 8. Multivariate regression model of teachers' use of ICT in schools

Variables	Un standardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta	4/474	0/000
Equipment and facilities of ICT in schools	0/300	0/067	0/185	4/789	0/000
The teachers' knowledge and skills in working with ICT	0/213	0/044	0/192	9/296	0/000
The teachers' attitude towards ICT in schools	0/575	0/062	0/387	4/474	0/000

In table 8, according to the significance levels obtained, all of which are less than 0.05, it is found that all of the independent variables of the research have the significance effect in the dependent variable the use of ICT. Also regarding the beta coefficient we can specify the most effective variable. The greater the coefficient of beta, the m ore effect it has on independent variable. Here, the teachers' attitude towards the ICT (0.387) has the most effect on the teachers' use of ICT, and the least effect (0.185) is related to the equipment and facilities of ICT in schools. To determine the extent to which the independent variables could explain the variance of dependent variable, the indices and statistics of independent variable regression analysis are shown in table 9.

Table 9. Regression analysis of the teachers 'use of ICT

Model	R	The coefficient of determination(R^2)	Adjusted coefficient of determination	Standard error of estimate
1	0/737	0/543	0/538	0/459

As you can see in table 9, the coefficient of determination (R^2) is 0.543 indicating that 54% of variance and changes of the teachers' use of ICT variable is explained by the independent variables of equation , and we can conclude that a significant amount (more than half) of the variance is explainable in research. Moreover, considering the obtained significance level which is less than 0.05, it can be realized that the independent variables have a significant effect on the dependent variable that is teachers' use of ICT. Standard error of estimate measures the distribution of points around the regression line (in two dimensional spaces) that have been estimated 0.459 according to the above table. The larger the value of this index, the higher distribution of points around the regression will be and vice versa.

Table10. Regression variance of the teacher's use of ICT in schools

Model	ANOVA			
	Total coefficient	Mean coefficient	F	Significance level
Regression coefficient	86/668	21/667	102/522	0/000
Remaining coefficient	72/912	0/211		
Total	159/580			

Also in order to analysis of the certainty of linear relationship between the dependent variable and the independent variables, the ANOVA table, there is a linear relationship between the dependent variable to determine uncertainty and independent variables, regression ANOVA table containing analysis of regression variance is provided. In this table, the regression line of the dependent variable changes which is explained by the independent variables, is estimated as 86/668(0.543=54%), and the line of remaining coefficient , mentioned the dependent variable changes , which is explained by the other factors (random and accidental) as 72.912(45.7 =46%).regarding the significance level of test , which is less than 0.05 with confidence coefficient of 0.095, the considered test is significant , and the relations of variables in regression is linear and significant. After collecting, classification, and analysis of answers given to open questions in questionnaire, and in order to determine the challenges of using ICT, a model of 5 total sets of challenges (organizational, management, financial-equipment, educational, and attitudinal) was obtained which is presented in table 11.

Table 11. Challenges of the use of ICT in teaching-learning process

Dimension	Factors
Organizational obstacles	Lack of motivational stimulus of organization in the use of ICT difficulty and complexity of working with ICT and Teachers lack of cooperation with each other
Management obstacles	Lack of managers' supervision on the implementation the plan of

	ICT entering to school Lack of relevance and appropriateness of lesson content with ICT The managing and controlling class when using ICT
Financial and equipment obstacles	Busy work responsibilities when using ICT Lack of computer and internet equipment in schools Lack of enough motivation of teachers in ICT application
Educational obstacles	Low Experience and skill of teachers in the use of ICT lack of practical in-service courses in the field of ICT application Lack of sufficient time for teaching ICT and...
Attitudinal obstacles	Distrust and anxiety of teachers in the use of ICT teachers concern of replacing ICT with them Negative attitudes of those involved in the Internet due to ethical issues

Conclusion

The aim of this study was to evaluate the use of ICT tools in Esfahan elementary schools. According to results, the teachers use of ICT in teaching-learning process in Isfahan elementary schools is higher than the mean level, which is consistent with the result of research conducted by Khoshkenar (2004). Passing more than a decade of entering information and communication technology to the education system, now it is expected that the situation of using E-learning tool in metropolitan schools such as Esfahan, to be far better and higher than the average level. So, considering the obtained results, the authorities and staff of the Education should pay special attention to better and more effective use of ICT to enjoy more of the positive and useful applications of these tools in educating and solving their problems; also it is expected that those involved in this matter try to know and solve the problems and challenges, so that application of ICT by teachers and students become facilitated and more possible. The other finding of the research shown that there is a relationship between the facilities of educational E-technologies in Esfahan elementary schools , and the teachers' use of the technologies , which is consistent with the researchers conducted by Snozik & Ertmer (2000).The results of the research indicated the positive, direct , and significance relation between two variables of equipment and facilities of ICT in schools , and the teachers 'use of the facilities; that is the more the E-equipment in schools, the more teachers' use of them would be , and vice versa. In the other words, with increasing the ICT equipment in schools, the teachers 'use of the equipment would be increased.

Moreover, there is a relation between the teachers informational knowledge and skills (the teachers' E-readiness), and the teachers use of ICT in Esfahan elementary schools, and the result is consistent with the research conducted by Piansupap and Walker (2005). The research results indicate the Strong and direct relationship between tow variables of the teachers informational knowledge and skills (the teachers' E-readiness), and the teachers use of ICT in schools , that is ,the more knowledge and skills the teachers have in working with

ICT, the more use of ICT in teaching and training in schools would be. In the other word, with increasing the teachers' knowledge and skills in working with ICT, their use of ICT would be increased. The other finding of research showed that there is a relation between tow variables of the teacher's attitude towards the use of ICT in education, and the use of these technologies in elementary schools. Undoubtedly, the positive attitude towards the effectiveness and usefulness of an act, have many effects on its conducting. Therefore, the teachers' attitude towards different dimensions of ICT such as easiness, usefulness, and effectiveness of using ICT in education, has a significant role in the teachers' use of the technologies, it means that those teachers who had more positive attitude towards the use of ICT, has used of it in education. In other words, with improvement of the teachers attitudes towards the application of ICT, their use of it would be increased, and vice versa. This result is consistent with the researchers conducted by Piansupap and Walker(2005), Paraskua, Buta, and Papayani (2008).Considering the challenges identified in relation to ICT application (organizational, management, financial-equipment, educational, and attitudinal) it is suggested that the Ministry of Education plan the clear and identified objectives, strategies, policies, and programs to enter and implement the ICT, and allocate budget and employ the expert work- forces of ICT in organization and schools, care for pre-service, in-service practical training , and equip the schools sites and classrooms with computer ,continuous and high speed internet . Schools managers should emphasize and care for using ICT in education and training. The teachers should have more cooperation and engagement to transfer the information and experiences to each other in the field of working with ICE tools, planning and implementing some programs to aware the teachers of the benefits of using ICT in teaching. Also the teachers should try more too present lesson content through ICT.

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