

A Study of Challenges and Perspectives on Utilizing Information and Communication Technologies in Teaching and Learning

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Abstract

The aim of this study is to determine the challenges and perspectives of utilizing information technology in the process of teaching and learning in an organizational framework and the organizational results (personal and organizational). The study is of applied type and its method is descriptive – measuring. The statistical population includes some high school and vocational school teachers of 11784 people and principals of 787 people, from all around the Isfahan province during 2012-13 school year. The sampling method was in proportion to the size of groups, and 720 teachers and 372 principals were selected as the sample of the research. The data collection method was through a researcher designed questionnaire which included 62 questions which was devised based on the Likert 5-level scale. The validity of the questionnaire is based on the Cronbach Alpha index of 0.88 and its validity was confirmed by the experts. Using inferential statistical tests, we analyzed the data. The one-way variance test and independent T-test were applied. The study results showed that in ingression variables, procedure and personal results, there was a significant difference between the high school and vocational school teachers. However, no difference was seen among the teachers in wealthy, semi-wealthy and deprived districts. Further, no difference was observed in organizational results between the high school and vocational school principals.

Keywords: Information and Communication Technology, Secondary School Principals and Teachers, The Teaching and Learning Process.

1.Introduction

We must consider the contemporary age as a combination of communications and information era. It is the era in which mankind has more need to get his information through communication. Today, by having access to technology and advanced communication means the exchange of information has become more viable (Yousofi Saied Abadi and Rezaei Raad; 2010: 147). The information technology is used for describing technologies that help us in collecting, saving, processing, retrieving, transferring and receiving the information (Holms, Translated by Azarakhsh and Mehrdad; 1998: 5). Perhaps what is more important than the meaning of information technology is to understand and express the notion of information technology. This is because, the notion of information technology has cultural, social and educational aspects in addition to technical and technological aspects. Consequently, the notion of information technology will eventually include all cultural and educational aspects with social, cultural, economical and even educational implications. As a result, this notion is not only considered as an effective hardware, but also as an effective software. And the depth of its effectivity will rise when the new tools and concepts of communication and information are utilized to form a new civilization based on information (Ebadi; 2005: 31).

Brown, Norburg, Srygley (1972); mention six major advantages of using technology in education: 1. It can increase the efficiency in education 2. It can help individual solo learning 3. It can help enhance learning based on scientific findings 4. It can help giving depth to the learning process 5. It can speed up learning 6. It can provide an equal learning opportunity for all.

The changes in the area of technology have affected the educational systems. In fact, one of the characteristics of the advanced educational systems is using the new potentials in the area of information technology (Mehr Mohammadi; 2004: 2). And it is with the help of information technology and communication that the process of learning and teaching can be facilitated and improved and then extended into a life-time adventure. In addition, the possibility for transferring, reconstructing and renovating of knowledge for people of all ages, including the youth, can be provided. As an effective factor, we must not ignore the effect of these technologies in changing and reconstructive process of teaching and learning.

The capability and value of different levels of information technology and its effect on strengths, opportunities, threats, weaknesses of students' learning and teaching methods of instructors are changing and developing day by day (Shabani; 2004: 185). Roblyer & Edward (2000) cited that technology, in general, and computer technology in particular, are among inseparable components of the teaching and learning process which help develop students' skills such as critical thinking skills.

Nowadays, the diverse information and communication technologies have the ability to facilitate the process of teaching and learning. In addition, the information and communication technologies can support international cooperation in student teaching and training. A range of options exist – from video conferencing to multimedia and websites – that can help facilitate the challenges before teachers. There are evidences that information and communication technologies may have the ability to enhance and increase the technics for expanding professional skills of the teachers in the current era (Jung; 2005: 1).

Therefore, the education system has gone under lots of different changes and pressures by external factors. In general, we can divide these pressures into two groups: 1. The increasing expectations of the parents and students 2. The pressure due to the changes in educational methods. In response to the mentioned pressures, the educational methods are evolving. These changes have triggered many changes in learning and teaching methods, parallel to the changes in the technology field (Mokhtari Eski; 2005: 139). Therefore, the educational planners must utilize the opportunities and challenges created by information technologies to improve and reconstruct the process of teaching and learning and try to strengthen these opportunities and weaken the challenges.

However, because using the information and communication for the purpose of quality teaching and learning has become inevitable for all (Brower, Dejonge, and Stout, translated by Mashayekh and Bazargan; 2003: 17) we must first look at the opportunities and challenges of utilizing these technologies in the field of education. This will prevent a blind imitation and will emphacize on an awareness based on knowledge. Therefore, it seems that the organization elements model is the most suitable way to achieve such awareness and knowledge in an educational system. In an organization elements model, the relations between what the organizations use, do or produce and the results of them are shown. Five organizational elements (ingression, process, product, exudation, and subsequences) can be divided into the following three groups:

- **Organizational efforts:** what the organization uses and does
- **Organizational results:** what is produced inside the organization
- **Social results:** what is produced for the community and is returned to it

Table 1: 5 Organizational Elements

Ingression	Ultra-advice	Personal Results	Organizational Results	Social Results
Available Human and Educational Resources, Needs, Goals, Pollicies, Laws, Values, Social Characteristics & Others.	The educational tools being used, the methods of implementation, The methods for teaching and learning, Management style & Others.	The finished courses, The learner’s educational growth, The acquired skills, Finishing the educational bases& Others.	Graduates, Job landers, Educational expenses, Expansion of educational justice, Increasing educational opportunities &Others.	Self-sufficiency, Social independence, Productive and effective activities that help society & Others.
Internal (Organization)		External (Community)		
Organizational Efforts		Organizational Results	Social Results	

Source: Coffman and Herman, 2003, Mashayekh and Bazargan, Page 51

In this model (Table 1) each organizational element is dependent on other elements. Organizational efforts relies on organizational results and these two will make social results (subsequences) possible (Coffman and Herman, Translation by Mashayekh and Bazargan: 50-51). Utilizing the organizational elements model in an educational planning helps identify the shortcomings that were not seen before (Coffman and Herman, Translation by Mashayekh and Bazargan: 50-51). For its widespread essence of social implications and time constraint, organiational elements model is used for assessing statistical population’s perspectives. Hence, considering the organiational elements model the current study will examine the challenges and perspectives of using information and communication technology in the process of teaching and learning in school environment. In other words, this study will look at the challenges and perspectives of using information and communication technology in the process of teaching and learning in school environment in the the organiational elements model’s framework (ingression and process) and organizational results (personal and organizational) in secondary schools of Isfahan province; or it will identify those areas for challenges and perspectives for using information and communication technology in the process of teaching and learning that have been ignored or neglected in educational planning.

2.Research Questions

1. Is there a difference in challenges and perspectives of ingressive results between vocational and high school teachers?
 - 1.1. Is there a difference in ingressive results of challenges and perspectives among the teachers in wealthy, semi-wealthy and deprived regions?

2. Is there a difference in challenges and perspectives process between teachers of vocational and high school?
 - 2.1. Is there a difference in challenges and perspectives among the teachers in wealthy, semi-wealthy and deprived regions?
3. Is there a difference in challenges and perspectives of personal results between teachers of vocational and high school?
 - 3.1. Is there a difference in challenges and perspectives of personal results among the teachers in wealthy, semi-wealthy and deprived regions?
4. Is there a difference in challenges and perspectives of organizational results between teachers of vocational and high school?
 - 4.1. Is there a difference in challenges and perspectives of organizational results among the teachers in wealthy, semi-wealthy and deprived regions?

3. Research Method

This study was conducted by a descriptive method and measurement type and it is of applied nature. The statistical population includes some highschool and vocational school teachers of 11784 people and principals of 787 people, from all around the Isfahan province during 2012-13 school year. The sampling method was in proportion to the size of groups, and 720 teachers and 372 principals were selected as the sample of the research. The data collection method was through a researcher designed questionnaire. Since there was no valid questionnaire available on the subject of this study, the researcher designed his own questionnaire. For this reason, first some literature from some magazines and periodicals on the subject of information and communication technology with an emphasis on the teaching and learning process was studied. In addition, several articles at the Ph.D. and Master's level (Azadmanesh 2005, Effat Nejad 2002, Fathi 2005, Richardson 1999, Fluke 2003, Oldfor 1998) related to the topic of research and other related topics were obtained and analyzed and finally a questionnaire was designed with the help of experts and instructors which included 62 questions on two subjects of organizational efforts and organizational results and four minor subjects of ingression, process, personal results and organizational results. To have a final assessment of the questionnaire, the Cronbach Alpha index was used. For this, a preliminary study was conducted and the questionnaire was tested on 30 teachers (15 high school and 15 vocational school teachers) and 20 principals (10 high school and 10 vocational school). After some analysis on the preliminary study results, the data from the questionnaire was evaluated using SPSS16 based on the Cronbach Alpha index to be equal to 0.88 which indicates the validity of the measuring tools.

Therefore, the questionnaire was designed based on the Linkert Scale, considering the framework used for the research (the organizational elements model, OEM). The questionnaire has two topics: First, it is about the organizational efforts with two dimensions of ingression and challenges and perspectives process resulted from utilizing information and communication technology in the process of teaching and learning; and the second is about the organizational results which examines the challenges and perspectives of two dimensions of personal and organizational utilizing information and communication technology in the process of teaching and learning. As a result, in these questionnaires and with respect to time limitations and based on the regional divisions and the development districts by the ministry of education in the province, they were divided to three groups of wealthy, semi-wealthy and deprived (The design and planning group for the Isfahan Province Main Office, 2013) and on this basis the questionnaire was distributed among samples for the study. Finally, the obtained results for analysis were punched into SPSS 16 software and by using inferential statistics (T-test and One-way Variance test) they were analyzed.

4. Research Findings

Question 1: Is there a difference in challenges and perspectives of ingressive results between vocational and high school teachers?

Table 2: The Results of the independent T-test for comparing the differences of ingressive results among high school and vocational school teachers.

Statistical Indexes of the teachers	Mean	Standard Deviation	T-test	Significance Level
High school teachers	36.32	9.49	-2.67	0.008
Vocational school teachers	34.44	9.39		

Based on the obtained results in table 2, the effect of being from high school or vocational school is significant ($P = 0.008$). In other words, the two groups of high school and vocational school were significantly different in the ingression variable and the response to the first part of the research question was positive. In addition, considering the means in table 2 for the vocational teachers is 36.32 and higher than that for the high school teachers, we can conclude that this variable is of more significance for vocational school teachers.

Question 1.1: Is there a difference in ingressive results of challenges and perspectives among the teachers in wealthy, semi-wealthy and deprived regions?

Table 3: The one-way variance analysis test (ANOVA) for ingression results comparison among teachers in wealthy, semi-wealthy and deprived regions

Statistical Indexes of Source Changes	Sum of Squares	Degrees of Freedom	Mean of Squares	F-Test	Significance Level
Inter-groups	308.136	2	154.068	1.74	0.176
Intra-groups	64622.000	720	89.753		
Total	64930.136	722	-		

Based on the obtained results in table 3, no significant effect of being wealthy was obtained. The significance level was equal to 0.176 and it is higher than 0.05. therefore, the answer to the second part of the first question is negative and there is no significant difference among the teachers of wealthy, semi-wealthy and deprived regions.

Question 2: Is there a difference in challenges and perspectives process between teachers of vocational and high school?

Table 4: The results of independent T-test for comparison among the difference in process results between teachers of vocational and high school

Statistical Indexes of the teachers	Mean	Standard Deviation	T-test	Significance Level
High school teachers	20.29	9.49	-2.98	0.003
Vocational school teachers	18.97	5.39		

Based on the results obtained from table 4, the effect of being from high school or vocational school is significant (P = 0.003). In other words, the two groups of teachers from high school and vocational school are significantly different in the process variable.

So the answer to the first part of the second question is positive and considering the mean for vocational school teachers of table 4 being equal to 20.29 shows a higher mean for them than the high school teachers. We can then conclude that this variable is more significant for vocational school teachers.

Question 2.1: Is there a difference in challenges and perspectives among the teachers in wealthy, semi-wealthy and deprived regions?

Table 5: The results of the one-way variance analysis test (ANOVA) for comparing the ingression results among the teachers in wealthy, semi-wealthy and deprived regions

Statistical Indexes of Source Changes	Sum of Squares	Degrees of Freedom	Mean of Squares	F-Test	Significance Level
Inter-groups	83.621	2	41.811	1.156	0.315
Intra-groups	25588.539	720	35.540		
Total	25675.160	722	-		

Based on the results obtained from table 5, no significant difference was observed in being economically rich or deprived. The significance is equal to 0.315 and it is more than 0.05; therefore, the answer to the second part of the second question is negative and there is no significant difference among teachers in wealthy, semi-wealthy and deprived regions for the variable of process.

Question 3: Is there a difference in challenges and perspectives of personal results between teachers of vocational and high school?

Table 6: The results of independent T-test for comparing the difference in personal results between the vocational and high school teachers

Statistical Indexes of the teachers	Mean	Standard Deviation	T-test	Significance Level
High school teachers	44.54	10.16	-3.209	0.001
Vocational school teachers	41.92	11.67		

Based on the results obtained from table 6, there is a significant difference between being a vocational school and high school teacher (P = 0.001). In other words, the two groups of teachers from high school and vocational school are significantly different in the personal results variable. Therefore, the answer to first part of the third question of the research is positive and considering the results by table 6 regarding the mean for

vocational school teachers being equal to 44.54, it is higher than that for high school teachers, and we can conclude that this variable is more significant for vocational school teachers.

Question 3.1: Is there a difference in challenges and perspectives of personal results among the teachers in wealthy, semi-wealthy and deprived regions?

Table 7: The results of one-way variance analysis test (ANOVA) for comparing the personal results in among the teachers in wealthy, semi-wealthy and deprived regions

Statistical Indexes of Source	Sum of Squares	Degrees of Freedom	Mean of Squares	F-Test	Significance Level
Changes					
Inter-groups	430.492	2	215.246	1/729	178
Intra-groups	87434.025	720	121.436		
Total	87864.517	722	-		

Based on the results obtained from table 7, no significant difference was observed in being economically rich. The significance level was equal to 0.178 and this is higher than 0.05. therefore, the answer to the second part of the third question of the research was negative and there was no significant difference among the teachers in wealthy, semi-wealthy and deprived regions

Question 4: Is there a difference in challenges and perspectives of organizational results between teachers of vocational and high school?

Table 8: The results of an independent T-Test for comparing the organizational difference between the vocational and high school teachers.

Statistical Indexes of the teachers	Mean	Standard Deviation	T-test	Significance Level
High school teachers	85.92	14.60	1.857	0.064
Vocational school teachers	89.03	16.29		

Based on the results obtained from table 8, there was no significant difference in being a vocational or high school teacher. Having a significance level of equal to 0.064, it is higher than 0.05. In other words, there is no difference in organizational results variable for vocational and high school teachers. Therefore, the answer to the first part of the fourth research question is negative.

Question 4.1: Is there a difference in challenges and perspectives of organizational results among the principals in wealthy, semi-wealthy and deprived regions?

Table 9: The results of a one-way variance analysis test (ANOVA) for comparing the organizational results among the vocational and high school principals of wealthy, semi-wealthy, and deprived regions.

Statistical Indexes of Source	Sum of Squares	Degrees of Freedom	Mean of Squares	F-Test	Significance Level
Changes					
Inter-groups	115.621	2	57.811	0.233	0.793
Intra-groups	92467.712	372	248.569		
Total	92583.333	374	-		

Based on the results obtained from table 9, there was no significant effect in being wealthy among the groups. The significance level equal is 0.793, and it is more than 0.05. Therefore, the answer to the second part of the fourth question is negative and there was no significant difference for principals in wealthy, semi-wealthy and deprived regions.

5. Discussion and Conclusion

Following the study of challenges and perspectives, applying the information and communication technology in the process of teaching and learning based on the first question of the research in chapter 1 will be examined as follows:

1. The findings regarding the first question of the research: is there a difference in challenges and perspectives of the ingestion results between the teachers of vocational and high school?
 - 1.1. Is there a difference in challenges and perspectives of the ingestion results between the teachers of wealthy, semi-wealthy, and deprived regions?

The results from a T-test and one-way variance test showed that the effect of being from vocational school or high school is significant. In other words, the two groups of teachers from high school and vocational school within the ingestion variable (suitable educational software for each major of study, sufficient hardware, appropriate technical support for trouble shooting, sufficient specialized human resources, transparency of the policies, objective legislation, presence of proper cultural conditions for a successful execution, prioritizing for allocating the capital, access to a fast telecommunication network, support by private sector, presence of proper

political conditions for a successful execution, clarity of credit provision resources, availability of institutions for teaching the skills required for using the information and communication technologies in the field of teaching and learning, presence of the essential infrastructures) had significant differences. As a result, the results of this research was in harmony with those by Yamamoto (2002), Sharif Khalifeh Soltani and colleagues (2011) regarding the ingression variable. Therefore, the answer to the first part of the first research question is positive. And considering the fact that the mean for vocational school teachers being equal to 36.33, it is higher than that for high school teachers. So we can conclude that this variable is more important for high school teachers. Subsequently, since the ingression variable is more important for vocational school teachers, it is essential to provide the vocational school teachers with more ingression variables. However, the effect of economical prosperity was insignificant; therefore, the response to the second part of the first question of the research is negative and there is no significant difference among teachers of wealthy, semi-wealthy, and deprived regions for the ingression variable.

2. Research findings with regard to the second question of the research: Is there a difference in challenges and perspectives of the process between the vocational and high school teachers?

2.1. Is there a difference in challenges and perspectives of the process among teachers of the wealthy, semi-wealthy, and deprived regions?

The results from a T-test and one-way variance test showed that the effect of being from vocational school or high school is significant. In other words, the two groups of teachers from high school and vocational school within the process variable (examining and identifying the executive obstacles and difficulties, existence of plans for investment, existence of standards for using educational software programs, existence of standards for using educational hardware components, a system of incentives for supporting the users (teachers), a good management support for resolving the problems, a mechanism for supervision, and a mechanism for assessment) were significantly different. The results of this research was in harmony with those by Yamamoto (2002), Sharif Khalifeh Soltani and colleagues (2011) regarding the process variable. Therefore, the answer to the first part of the second research question is positive. And considering the fact that the mean for vocational school teachers being equal to 20.29, it is higher than that for high school teachers. So we can conclude that this variable is more important for high school teachers. However, the effect of economical prosperity was insignificant; therefore, the response to the second part of the second question of the research is negative and there is no significant difference among teachers of wealthy, semi-wealthy, and deprived regions for the process variable.

3. Research findings with regard to the third question of the research: Is there a difference in challenges and perspectives in the personal results between the vocational and high school teachers?

3.1. Is there a difference in challenges and perspectives in the personal results among teachers of the wealthy, semi-wealthy, and deprived regions?

The results from a T-test and one-way variance test showed that the effect of being from vocational school or high school is significant. In other words, the two groups of teachers from high school and vocational school within the personal results variable (paying more attention to the personal differences of the students, adding to the visual and verbal harmony, intensifying the motivation in students, meaningful learning event, increasing the creative ability in students, reducing the chance for educational failure, increasing the power of generalizing and transfer of knowledge, reducing the amount of anxiety from exams, empowering the critical thinking, training students to be more investigative, making teachers to be more investigative, enhancing the self-confidence in teachers and increasing the sense of responsibility in students) were significantly different. The results of this research was in harmony with those by Karimi Alavijeh and colleagues (2009). Therefore, the answer to the first part of the third research question is positive. And considering the fact that the mean for vocational school teachers being equal to 44.54, it is higher than that for high school teachers. So we can conclude that this variable, similar to the last two variables of ingression and process, is more important for high school teachers. However, the effect of economical prosperity was insignificant; therefore, the response to the second part of the second question of the research is negative and there is no significant difference among teachers of wealthy, semi-wealthy, and deprived regions for the process variable.

4. Research findings with regard to the fourth question of the research: Is there a difference in challenges and perspectives in the organizational results between the vocational and high school Principals?

4.1. Is there a difference in challenges and perspectives in the organizational results among Principals of the wealthy, semi-wealthy, and deprived regions?

The results from a T-test and one-way variance test showed that the effect of being from vocational school or high school is significant. In other words, the two groups of principals from high school and vocational school within the organizational results variable (providing opportunities for cooperation with advanced schools in other countries and teaching and learning to expand innovation in lesson planning, providing opportunities to use international investment funds, moving school towards globalization, wider utilization of information, increasing the research ability in Principals, expanding more educational fairness, increasing educational opportunities,

synchronizing students with cultural changes in a national level, synchronizing students with social changes in a national level, increasing the students ability in doing research, development and expansion of academic resources in the framework of information and communication technologies, synchronizing students with scientific-educational changes in a international level, reduction of educational costs, enhancement of class teaching, making learning a life-time enterprise, diversifying the teaching methods, increasing flexible access to scientific resources, increasing the interaction between the teacher and the students, facilitating the assessment process, making educational assessments more scientific, making the education more student-centered, strengthening a more flexible educational models, increasing coral activities, reduction of time limitation, reduction of locational limitation) were significantly different. The results of this research was in harmony with those by Sharif Khalifeh Soltani (2010). Therefore, the answer to the second part of the fourth research question is negative. And there is no significant difference among principals of wealthy, semi-wealthy, and deprived regions for the process variable.

6.Resources

- Azadmanesh, Nahid (2005). Feasibility Study on Using Information and Communication Technologies in Higher Education Accademic Planning, Unpublished Final Thesis for Master's Degree in Educational Planning, Shahid Beheshti University: College of Educational Sciences and Psychology.
- Behan, Kate and Holms, Diana (1998). An Introduction to Information Technology, Translated by Mohammad Azarakhsh and Jafar Mehrdad, Tehran: Samt Publications
- Brewer, Dujonj, Stont. (2003). Towards Online Learning, Translated by Farideh Mashayekh and Abbass Bazargaan, Tehran: Agah Publications, First Edition.
- Sharif Khalifeh Soltani, Sayyed Mostafaa and Karimi Alavijeh, Mehdi and Mazaheri, Mehdi. (2011). Examining the Challenges of Using Information and Communication Technologies in the Teaching and Learning Process. Journal of Information and Communication Technologies in Educational Sciences, No. 3, Page 23 to 43.
- Shabani, Hassan. (2004). Challenges and Approaches of Information Era and the Need for a Change in the Structure and Procedures of Implementing Higher Education Academic Planning, Tehran: Ayij, The Association of Academic Planning of Iran, First Edition.
- Ebadi, Rahim. (2005). Information Technology and Education, Tehran: Ministry of Education, Monadi Tarbiyat Cultrual Institute.
- Karimi Alavijeh, Mehdi and Sharif Khalifeh Soltani, Sayyed Mostafaa and Bakhtiyar Nasr Abadi, Hassanali (2009). Perspectives of Using Information and Communication Technologies in the Process of Teaching and Learning in Higher Education. Higher Education Magazine, No. 4: Page 179.
- Coffman, Roger, and Herman, Jerry. (2003). Strategic Planning in Educational Systems: Reflection, Renovation, Structures, Recreation. Translated by Farideh Mashayekh and Abbass Bazargaan. Tehran: Ravan.
- Mokhtari Eski, Hamid Reza. (2005). The Role of Information Technology in Scientific-Applied Education, The Fourth Conference on Scientific-Applied Teachings, Sas 132-145.
- Mehr Mohammadi, Mahmood. (2004). A Reflection on the Concept and Result of an Educational Revolution in the Information and Communication Era, Tehran: Ayij, The Association of Academic Planning of Iran, First Edition.
- Yousefi Saied Abaadi, Reza and Rezaie Raad, Mojtaba (2010). Comparison of Level of Familiarity and Use of Information and Communication Technologies by very Large Departments of Azad Universities of Mazandaran Province, Educational Management Journal of Scientific Research, No. 5. Page 147 to 164.
- Brown, James, w., Norberg, Kenneth. D., Stvgley, Szraa. K. (1972). Administrereng educationa media. (2nded). M.C. Graw-Hill. New York. Book Company.
- Yamamoto, T. (2002). The difference of information technology visions between the faculty and students in the engineering laptop institution. Unpublished doctoral dissertation, Indiana State University.
- Roblyer, M & Edwards, J. (2000). Integrating Educational Technology into Technology, 2 th ed, upper saddle river. NJ: practice Hall .
- Jung, I. (2005). ICT- pedagogy integration in teacher training: application cases worldwide. Educational Society 94.101.