

Investigating challenges and outlook for implementation of information technology in learning process: A university professors' perspective

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ABSTRACT

During the past few years, there have been significant interests in using information technology in educational systems. There is no doubt that there are different advantages associated with the implementation of information technology in educational systems. However, there are also some barriers in having successful implementation of IT in educational universities. This paper performs an empirical study to learn more on advantages and barriers on successful implementation of IT in governmental universities in Iran. The study distributes 101 questionnaires among a population of university professors who worked for two universities in city of Esfahan, Iran. The results of survey indicates that three factors including lack of good standards, sufficient infrastructure and good support on behalf of private sectors are the most important challenges for IT implementation. On the advantages, instructors and students' abilities to find their needs using different search engines, increase in their communication skills and self-confidence are the most important factors detected by this survey.

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1. Introduction

For many years, traditional learning was the basis of teaching in schools and universities. Students used to attend physical classes to learn, which was inconvenient when there was a long distance between the residential places and schools. Even participating in such classes needs significant investment and still there are many cases where it is not economical to construct educational building to serve limited number of people. For instance, in Iran, there are many small towns where there are fewer than 20 families live there and it is difficult to send instructors to such towns. In such circumstance, the recent advances of information technology (IT) could reduce the cost of educations, significantly. Using IT in educational systems has become one of the most popular methods for breaking obstacles between the people who want to learn and cannot attend physical schools.

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During the past few years, there have been significant attempts on developing educational studies through internet and its applications. Distance learning has many advantages such as removing unnecessary transportation costs (Febry & Higgs, 1997), saving energy, creating opportunities for many people who cannot attend regular educational studies, etc.

The idea of e-learning is not new and it goes back to 19th century, where some distance learning schools were built in North American and European countries using post office services. First collegiate distance learning based post office was established in 1892. In the mid-twentieth century, there was also a variety of educational programs, which was presented to different audiences. Since then, e-learning has changed significantly since many people from different countries could participate in such courses from various countries. They could share their opinions and learn from their experiences especially in management level skills. Physicians could exchange their experience using internet facilities and prescribe suitable medications for the patients who cannot travel.

One obvious advantage of learning over internet facilities is to reduce the cost of learning as much as possible. Learning through internet reduces many physical infrastructures and replaces them with computers and technology. Many human resources such as university professors across the world could participate in these universities and contribute with no need to travel, physically. Present age of exact global competition and quickly improving technologies and improving information systems has forced companies to use new business management techniques (Baykasoglu & Kaplanoglu, 2008). Many of courses are normally prepared in different forms of sharable content object (SCO) and they can be shared among many students over a reasonable number of educational terms depending on the nature of course. For instance, we can produce a comprehensive SCO for a course named fundamentals of physics and use it virtually for years since the content of this course does not change, significantly.

Despite the fact that there are many advantages associated with the implementation of IT in educational systems, there are many barriers and difficulties in practice. Pelgrum (2001) investigated barriers to the integration of ICT in education by a comprehensive assessment on world-side educational systems. Jones (2000) performed a survey of the implementation of information technology in the teaching/learning environment of sciences in selected schools in Alberta, Canada. Abdelaziz et al. (2011) presented a technique for assessment of e-learning system against traditional learning programs for undergraduate nursing students and reported that lack of computer skills of students influenced their abilities to communicate efficiently with the instructor and failed to participate in various online communication methods. The people who attended the study were happy with the e-learning program as a teaching method, but they were interested in e-learning program only when they had computer and Internet at home.

Krause et al. (2009) studied factors of cooperative learning and feedback on e-learning by 137 colleague students who took part in a survey. They believed cooperative learning enhanced perceived performance, competence and collective efficacy could impact on self-efficacy. Payne et al. (2009) looked to know whether an e-learning method could be used to train employees in highly specialized skills using expert individuals and extensive prolonged training. The approach used the development of e-learning facilities including simulations and interactivity. They also (2009) explained that simulations was a powerful technique in the design of successful e-learning packages in preparing learners for real-world applications.

Ćukušić et al. (2010) performed an empirical study on e-learning process management and the e-learning performance. The study used a sample of 14 European schools participating in an EU-funded project. They reported the existence of a relationship between planning and controlling of the e-learning process and the learning outcomes.

Cegarra-Navarro et al. (2007) investigated four learning techniques introduced in the literature on four various levels of e-business including null, relational, internal and external by a survey of 130 SMEs in the Spanish telecommunications sector. The survey was performed by gathering a multinomial logistic model, validated by factor analysis. They reported that to use e-business, firms are required to provide the acquisition, interpretation and storage of knowledge as prior steps. The findings further recommended that knowledge acquisition was necessary to progress from relational level to internal level.

Bhuasiri et al. (2012) found critical success factor (CSF) for e-learning in developing countries and identified CSFs, which influence the acceptance of e-learning systems. The study chose multiple factors, which influence the success of e-learning systems from the literature and compared the relative importance between two stakeholder groups in developing countries including ICT experts and faculty. They provided different suggestions to help the implementation of e-learning systems for developing countries. AbuSneineh and Zairi (2010) provided an assessment framework for e-Learning effectiveness in the Arab World. Keramati et al. (2011) studied the impact of e-learning readiness on the performance of e-learning programs through an empirical study and indicated that organizational readiness factors were the most important factors on e-learning outcomes. In addition, teachers' motivation and training was the most important element in e-learning.

The proposed study of this paper is implemented for a real-world case study of some governmental universities located in Esfahan/Iran. The organization of this paper first presents details of our implementation in section 2 and the results of the survey is included in section 3. Concluding remarks are given in the last to summarize the contribution of the paper.

2. The proposed study

In this survey, we perform a survey among all people who were involved with e-learning in the two schools in Esfahan. The population of our survey covers 866 university professors who worked for two schools in Esfahan. The questions are in qualitative perspective from very low to very high in Likert scale (Likert, 1932). We also assigned weight values of one to five for different scales from very low to very high, respectively. Finally we assume the population follows a normal distribution. Therefore we could use the following formula to calculate the minimum number of sample size,

$$n = \frac{N \times z_{\alpha/2}^2 \times p \times q}{\varepsilon^2 \times (N - 1) + z_{\alpha/2}^2 \times p \times q}, \quad (1)$$

where N is the population size, $p = 1 - q$ represents the yes/no categories, $z_{\alpha/2}$ is CDF of normal distribution and finally ε is the error term. Since we have $p = 0.5$, $z_{\alpha/2} = 1.96$ and $N = 866$, the number of sample size is calculated as $n = 101$. We first selected a sample 20 people and performed the survey and calculated Conbach Alpha, which yields 0.88 and this is well above the minimum level of 0.70.

3. Results

There are four parts associated with the proposed study of this paper. In the first part, we survey different challenges in implementing IT in educational systems. Table 1 shows details of our survey. As we can observe, nearly 76% of the participants believed that there was not a good support on behalf of private sectors. The other important challenge seems to be the lack of a good internet infrastructure. Another important issue is that there is not a transparent strategy for using IT in governmental schools of the city. The lack of a good technical support, necessary hardware equipments and priority are among other important challenges on the implementation of IT.

Table 1

Statistical observations on the effects of internal factors for IT implementation

	Statistics	Very low	Low	Middle	High	Very high	Mean
There is a support from private sector.	Freq.	18	59	18	4	2	2.1386
	%	17.8	58.4	17.8	4	2	
There is a fast and reliable internet service.	Freq.	23	45	23	9	-	2.2079
	%	22.8	44.6	22.8	8.9	-	
There is a transparent strategy.	Freq.	22	45	25	9	-	2.2079
	%	21.8	44.6	24.8	8.9	-	
There is a good technical support for trouble shooting.	Freq.	3	60	33	5	-	2.3960
	%	3	59.4	32.7	5	-	
There are sufficient hardware packages for IT implementations	Freq.	3	52	39	5	-	2.5149
	%	3	51.5	38.6	5	-	
There is a priority for IT implementation.	Freq.	29	24	38	9	1	2.2970
	%	28.7	23.8	37.6	8.9	1	

Table 2 shows other important factors influencing IT implementation, which are more associated with the necessary infrastructures.

Table 2

Statistical observations on the frequency of different factors for IT implementation

	Statistics	Very low	Low	Middle	High	Very high	Mean
There are some standards for the required educational IT hardware.	Freq.	10	64	14	13	-	2.2970
	%	9.9	63.4	13.9	12.9	-	
There is a method for performance measurement.	Freq.	35	24	34	8	-	2.1485
	%	34.7	23.8	33.7	7.9	-	
There are good standards for the required IT software packages.	Freq.	10	48	30	13	-	2.4554
	%	9.9	47.5	29.7	12.9	-	
All issues and difficulties are detected.	Freq.	10	48	30	13	-	2.3960
	%	9.9	47.5	29.7	12.9	-	
There are sufficient hardware packages for IT implementations	Freq.	3	52	39	5	-	2.4158
	%	3	51.5	38.6	5	-	
There is a promotion plans for the system.	Freq.	7	49	28	16	1	2.5545
	%	6.9	48.5	27.7	15.8	1	
The management supports for helping users are sufficient.	Freq.	17	39	35	8	2	2.3960
	%	16.8	38.6	34.7	7.9	2	
There is a good monitoring system.	Freq.	17	37	34	12	1	2.4356
	%	16.8	36.6	33.7	11.9	1	

Among the factors demonstrated in Table 2, the lack of a method for measuring the performance of an IT based system is the most important one followed by the lack of good standards for having efficient e-learning system. Table 3 shows the advantages of opportunities, which could be created by IT systems.

Table 3

Statistical observations on the frequency of different advantages of using IT implementation

	Statistics	Very low	Low	Middle	High	Very high	Mean
Instructors will increase their searching abilities.	Freq.	1	9	17	58	16	3.7822
	%	1	8.9	16.8	57.4	15.8	
Students will increase their searching abilities.	Freq.	-	8	23	58	12	3.7827
	%	-	7.9	22.8	57.4	11.9	
IT can increase communications' abilities.	Freq.	2	13	25	58	3	3.4653
	%	2	12.9	24.8	57.4	3	
People could present their abilities.	Freq.	5	14	26	48	8	3.3960
	%	5	13.9	25.7	47.5	7.9	
IT can increase students' self-confidence.	Freq.	2	10	34	43	12	3.5248
	%	2	10	34	43	12	

As we can see from the results of Table 3, the people who participated in our survey mostly believe that the implementation of IT in educational systems could increase instructors and students' abilities to find their needs using different search engines. They also agreed that IT could increase people's abilities, communication skills and their self-confidence. There are other advantages on the implementation of IT summarized in Table 4. According to the results of this table, IT implementation provides better information and helps users access to more diversified sources of knowledge.

Table 4

Statistical observations on the frequency of different advantages of using IT implementation

	Statistics	Very low	Low	Middle	High	Very high	Mean
IT implementation diversifies educational system.	Freq.	1	11	7	38	44	4.1188
	%	1	10.9	6.9	37.6	43.6	
Users are able to have more information.	Freq.	1	2	18	35	44	4.1900
	%	1	2	18	35	44	
The access to information is more flexible.	Freq.	12	2	10	34	43	3.9307
	%	11.9	2	9.9	33.7	42.6	
Physical facilities are needed less.	Freq.	-	12	21	41	27	3.8218
	%	-	11.9	20.8	40.6	26.7	
IT increases university professors' capabilities.	Freq.	4	13	17	31	36	3.8119
	%	4	12.9	16.8	30.7	35.6	
Education will be student basis.	Freq.	1	8	24	49	17	3.7374
	%	1	8.1	24.2	49.5	17.2	
Globalization will be facilitated.	Freq.	13	3	20	29	35	3.7000
	%	13	3	20	29	35	
The quality of teaching will be improved.	Freq.	4	3	30	51	12	3.6400
	%	4	3	30	51	12	
There is a new opportunity for attract foreign investors.	Freq.	16	4	19	33	28	3.5300
	%	16	4	19	33	28	
IT creates new opportunities for sharing experience in the world.	Freq.	17	4	19	46	15	3.3762
	%	16.8	4	18.8	45.5	14.9	
Learning sources will be improved based on IT advances.	Freq.	1	17	23	33	27	3.6733
	%	1	16.8	22.8	32.7	26.7	
There is less time limitation.	Freq.	2	11	28	44	16	3.5446
	%	2	10.9	27.7	43.6	15.8	
Educational opportunities will increase.	Freq.	17	3	21	47	13	3.3564
	%	16.8	3	20.8	46.5	12.9	
Educations will become fair.	Freq.	15	7	20	40	18	3.3900
	%	15	7	20	40	18	
Continuous learning will become permanent.	Freq.	2	20	24	38	17	3.4752
	%	2	19.8	23.8	37.6	16.8	
Students will be more paramount on social changes.	Freq.	1	19	31	32	18	3.4653
	%	1	18.8	30.7	31.7	17.8	

In IT based system, it seems that education will be more student-based and it could build a bridge for people around the people to connect with each other. Students will be able to improve their learning skills and instructors could update themselves by using an integrated IT based systems. There are other advantages in having IT systems, which are mostly confirmed by our survey people and they are listed in Table 4.

4. Conclusion

In this paper, we have presented an empirical study to learn more about the advantages and the barriers on successfully implementing IT in governmental universities in Iran. The study distributed 101 questionnaires among a population of university professors who worked for two universities in city of Esfahan, Iran. The results of survey showed that three factors including lack of good standards, sufficient infrastructure and good support on behalf of private sectors are the most

important challenges for IT implementation. On the advantages, instructors and students' abilities to find their needs using different search engines, increase in their communication skills and self-confidence are the most important factors detected by this survey.

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