An Analysis of Factors Affecting the Intention of students to Using E-learning through virtual education Case Study: Virtual Faculty Students in University of Isfahan

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Abstract: The Internet has dramatically affected the deployment of virtual education. Virtual education is a term that encompasses online education through internet or electronic learning (E-learning). E-learning includes all learning methods which use new technologies. In most cases, e-learning refers to using computer networks or the internet to educate people. This study analyzes the factors that influence students' intention to use e-learning through the internet, and its population is virtual faculty students in University of Isfahan who have completed questionnaires either by their presence or through the internet (electronic questionnaires). This study's model includes five factors: social influence, facilitating conditions and e-learning motivation which have been used in previous studies to evaluate the students' intention to using e-learning; system quality and perceived benefits also are two factors that have been added to them. Spss 19 and Amos 18 software was used for data analysis. Results indicate the influence of perceived benefits and motivation and the ineffectiveness of facilitating conditions on the intention to use virtual education. Likewise, it was indicated that system quality influences the perceived benefits while, social influence are not effective. Finally, some recommendations are presented for the development of electronic government and citizen and also improvement of e-learning by mobile phones.

Key words: Electronic learning (e-learning), virtual education, motivation, perceived benefits, system quality

INTRODUCTION

The development of information technology has led to the spread of online learning as an important method of education (Lim *et al*, 2007), and intern*et al*so has had an important role in electronic learning. E-learning involves learning through electronic media including internet, intranet, extranet, audio and video tapes, satellite broadcasting, television and CDs. A closer look, e-learning refers to the use of the Internet to provide a range of methods that will increase knowledge and academic performance (Govindasamy, 2002; Khan, 2001; Rosenberg, 2001). Clark and Mayer (2011) have defined e-learning as a method of presenting the contents by digital devices such as computer and mobile in order to improve the process of learning. E-learning as a growing new trend of learning and an important strategy for promoting and improving education, has developed in all major countries of the world (Chu *et al*, 2011). It has also strengthened the cooperation between education and Internet technology by increasing the speed of data transfer volume (Tzeng *et al*, 2007). According to the definition provided by Alavi and Leidner in their research (2011), e-learning is a virtual learning environment in which the learner interacts with classmates, teachers and educational equipments through information and communication technology (ICT). This is different from the traditional environment since in the virtual environment, the electronic communication technology is used as a tool to support and improve the process of learning. The most popular definition for electronic learning is presented by the American Society of Training and Development which has defined it as a wide range of programs and processes, including web-based training, computer-based training, virtual classrooms and digital collaborations. Web-based courses are numerous and allow the students to have different learning activities in a virtual classroom (Hiltz, 1994; Stefansson, 2004; Veermans & Cesareni, 2005). E-learning, in various ways creates opportunities for the trainees and offers a wide range of innovative services such as virtual education. Virtual education is an online training course using Internet. This term often refers to the internet facultys and in higher education is called virtual university. This type of educational strategy is called as virtual education, distance education, online education, web-based training (education) and e-learning. Currently, e-learning has become a growing tool for the promotion of education due to its cost reduction, reusability and flexibility for the learner (Tzeng, 2007). E-learning is known as a way that is used to adapt the people and organizations to the changes in the global economy, especially in the Internet era, since it is

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affordable, flexible, and can be easily presented without any time or distance restrictions (Carey and Blatnik, 2005). Identifying factors in the adoption and application of technology, this study analyzes the factors which influence the intention to use e-learning through virtual education by virtual faculty students in University of Isfahan. The following is the research background related to the topic and then the research model and hypotheses are presented, and finally the research methodology, analysis, findings and recommendations will be presented.

2. Research Background:

Researches show that through the web, students can be effective learners and, if not more, at least as traditional courses learn (Tzeng, 2007). It has been shown that many technology features such as perceived flexibility, convenience and availability affect the outcomes of e-learning (Arbaugh and Duray, 2002). Several models have been used to evaluate e-learning and recognize the factors which influence the adoption and use of it. For example, perceived benefits, perceived ease of use and flexibility (Arbaugh, 2002); motivation, being comfortable with technology and access (Piccoli *et al*, 2001); computer skills and basic knowledge about e-learning (Thurmond *et al*., 2002); have been linked with learning through the web and use of ICT for educational purposes (Maldonado *et al*, 2010). In comparison with these factors, there is less understanding of learners' internal factors. Some psychological factors have an impact on the outcomes of e-learning. These factors are: initial experience with computers, efficacy in computer skills, motivation, concern over the use of computer and fear of communication (Lee *et al*, 2005), also factors such as characteristics of the teacher, educational content, perceived enjoyment when using e-learning system (Lee and Lee, 2009); attitude, the web's ease of use and the aim of use (Sanchez Franco *et al*., 2009), have been identified as effective factors in using e-learning.

Shyong Ong *et al* (2004), in a study evaluated the engineers' decisions in accepting e-learning and added a new factor, perceived credibility, to the Technology Acceptance model and evaluated it. The findings strongly supported the role of Technology Acceptance model in engineers' accepting of e-learning. Nikolz (2008) identified the major factors affecting e-learning in students as, students' tendency to computers, their personal motivation, environmental triggers, satisfaction, students' past performance and their demographic characteristics. Maldonado *et al* (2010), in their research evaluated the role of motivation in the adoption and application of e-learning system and vice versa the impact of technology on students' motivation, the subject area and age also were tested as mediating variables. Findings showed that motivation and social influence have a positive effect on behavioral intention, while facilitating conditions do not affect the use of e-learning. Also the role of area as a modulator was identified. Appropriate educational content, availability of ICT infrastructure, using software and an appropriate educational media have been identified as factors affecting the success of e-learning system that were divided into two categories: interactions and social factors, and educational content and tools. Elahi *et al* (1390) have done a research to develop and localize the factors which influence the virtual students' intention to e-learning. They evaluated four dimensions of environmental and infrastructural factors, individual learner and his characteristics, educational content and educational media. The results showed that the individual (personal) factors are the most effective factors and the media factors occupied the lowest position.

Based on presented background, the model of this research consists of five factors: social influence, facilitating conditions and motivation which have been used in previous studies to evaluate the students' intention to using e-learning (Malando *et al*, 2010), system quality and perceived benefits also are two factors that have been added to them.

2.1. Electronic Learning:

Electronic learning involves all kinds of learning using advanced technology. In most cases, e-learning, primarily refers to the technology of computer networks or Internet in providing information and training individuals (Welsh *et al*, 2003). Using e-learning started from the mid-1980s and has developed by the expansion of high-speed Internet (Kanuka and Anderson, 2007). Factors influencing the success of e-learning are divided by Khan (2005) into eight categories: educational factors, technology, interface design, management, support, human resources, organizational resources and evaluation. E-learning method has many outstanding benefits for the students, who use this approach, including:

- No time limit (24 hour course is available to students).
- No spatial constraints (education in home, workplace, etc).
- Students select courses in accordance with the schedule and conditions
- No need for student's participation in education and learning
- The adjustment of learning speed in accordance with individual's learning
- Immediate or direct use of educational topics or saving them for use at the right time

2.2. The Research Hypotheses:

Social influence is achieved when people's attitude is changed by some external inputs; for example, data which are obtained during the communication. Social influence has been investigated as an important factor in predicting the behavior which influences the use of technology. According to the theory of reasoned action, customers' attitudes are influenced by objective norms and what important people believe they should or should not do for someone will affect their behavior (Venkatesh and Davis, 2000). According to a new information system, the social influence process has a determining role in users' commitment to use a new information technology (Malhotra and Galletta, 1999), thus, from the viewpoint of Davis *et al* social influence can directly influence the behavioral intention. On the other hand, perceived value has a somewhat internal state, thus, customers' feelings are influenced by external environment such as other people's opinions (Cheng *et al*, 2011). Many studies also have shown that social influence has a positive effect on perceived benefits. When friends, colleagues or family members have a positive view to virtual education and recommend it, it may appear more useful for the users (Gu *et al*, 2009). Therefore, this research will test the following hypotheses:

Hypothesis 1. Social influence has a positive effect on students' perception of the benefits of virtual education.

The system quality for the first time was introduce by DeLone and McLean (1992) and has been defined as the quality of the overall system performance which is measured by the users' perception. In e-learning, the system quality refers to the network speed and system's stability. The system quality influences the using intention and customers' satisfaction (DeLone & McLean, 2003). If e-learning services are delivered with accuracy and speed, the users' appreciation of it will be better. Thus, the following hypothesis is considered:

Hypothesis 2. System quality has a positive impact on the students' perception of the benefits of virtual education.

Perceived benefits refer to the benefits and advantages that a user believes are supposed to be achieved by e-learning (van Biljon and Kotze 2008) and increase the level of his performance (Klopping and Mckinny, 2004). People evaluate the consequences of their behavior in terms of perceived benefits and desirability of those benefits (Kim *et al*, 2007). For example, lower costs in e-learning provide more opportunity for personal development. Professional development courses for employed people make them spend a time outside the working environment that the employer may not agree with it, but now because of virtual education courses it is possible since there is no need to spend time to attend classes; it is more advantageous as well. Now employees can easily have access to materials and simultaneously make balance between learning and business and no longer are forced to be away from their work for a few days (Bell, 2007). E-learning, by providing a learning environment with lower costs, has terminated time and spatial limitations. Based on what was mentioned the following hypothesis is considered:

**Hypothesis 3.** Perceived benefits positively influence the intention of students to use virtual education.

Students' motivation plays an important role in e-learning (Conati, 2002). Motivation in learning refers to students' motivation to have a significant and valuable academic effort, and their attempts to obtain academic and educational benefits (Brophy, 2004). Pintrich and Schrauben (1992) suggest that students' motivation is influenced by the value they receive from the results; they believe this motivation provides a cognitive interaction which in turn will lead to use. The learners who participate in e-learning courses need to have some certain features and abilities and since the first condition of learning is motivation for learning, in e-learning the learner should have a high internal motivation in order to learn in a higher level. However, e-learning is almost a new topic and e-learners are a specific group of users (Ong *et al*, 2004). Therefore, to recognize the factors which influence the use of e-learning some variables are needed to entirely reflect the motivations of e-learners. According to the above reasons, the following hypothesis is considered:

Hypothesis 4- E-learning motivation has a positive effect on students' intention to use virtual education.

Facilitating conditions are defined as assistances from the external environment for the users so that they can overcome the obstacles of a new information technology (Bergeron, Rivard, & De Serre, 1990; Lu, Yu, Liu, & Yao, 2003; Venkatesh & Davis, 1996). If the environmental conditions are provided to assist the users on how to use e-learning services, their understanding of it (e-learning services) will be easier, even if they do not have enough skill to use it (Gu *et al*, 2009). According to what was mentioned, the following hypothesis is arisen:

Hypothesis 5- Facilitating conditions can positively influence the intention of students to use virtual education.

According to the theoretical foundations and offered assumptions, the research's suggested model is as follow:
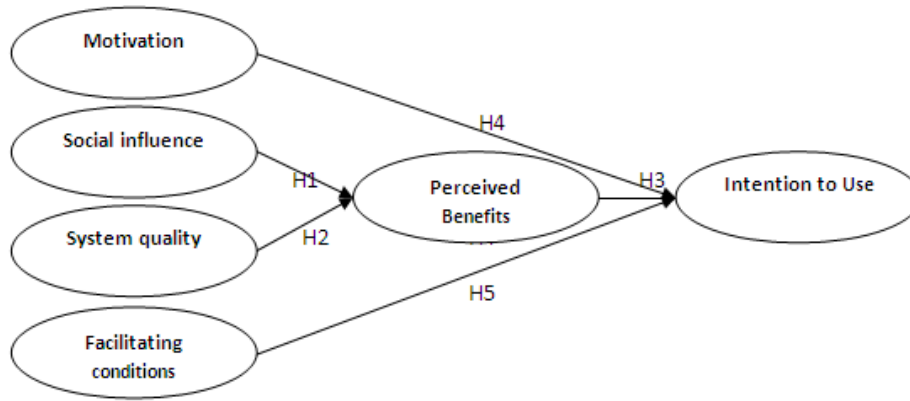
Fig. 1: Research's Conceptual Model

3- Methods:

Since the purpose of research, is analysis of the factors which affect the intention in using e-learning through virtual education, from the viewpoint of practical aims and methods of data collection, this study is a descriptive-survey study. The main tool for data collection is questionnaire, which by using survey studies including a comprehensive review of theoretical topics was designed and its validity was checked by using face validity. The questionnaire was given to experts in this field and after modifying and deleting several items, it was confirmed. Validity refers to being correct and true. By validity it means that the desired features and characteristics can be measured by measurement scales or tools. Finally, based on Likert's five-choice spectrum a questionnaire consist of 23 questions was prepared in which option 1 meant completely disagree and option 5 meant completely agree. The sources of each item are shown in Table 2. Spss 19 and amos 18 software was used for data analysis. The research's population is virtual faculty students in University of Isfahan who completed the questionnaires either by their presence (in person) or through Internet (e-mail), and finally 121 questionnaires were accepted. Based on the analyzed data, demographic features are shown in Table 1.

Table 1: demographic features

		frequency
Gender:	Male	61.8
	Female	38.2
Age:	22 to 25 years old	15.8
	26 to 29	39.5
	30 to 33	13.2
	34 to 37	15.8
	More than 37	15.8
Do you work while you are studying?	Yes	87.17
	No	12.3
To what extent do you agree with virtual education in your study?	1 to 10 percent	20.3
	11 to 30 percent	13.5
	31 to 50	17.6
	51 to 70	24.3
	71 to 100	24.3
How to receive and send questionnaire	By presence	67.3
	Electronic questionnaire	32.7

Demographic data analysis indicates that most respondents are male. Age distribution shows that the most samples with 39.5 percent are between 26 to 29 years old and the minimum sample with 13.2 percent belongs to the age group 30 to 33. Likewise, 87.7 percent of them while studying in a virtual faculty are also employed and a high percentage of them are willing to use virtual education in higher levels of education. The majority of questionnaires were received and completed in person.

4- Research's Data Analysis:
4-1- Reliability Capability:

Reliability and trust capability is one of the technical features of measuring instruments which shows the results obtained by measurement tools in similar conditions to what extent are similar. Cronbach's alpha is used to make internal consistency in measurement tools such as questionnaires and testes which measure some features. Thus, Cronbach's alpha coefficient was calculated for each variable in this study. Cronbach's alpha coefficient in variables and also measured items' number and sources are shown in Table 2.

Table 2: The Reliability of Variables:

Variable	Sources of items	Number of items	Cronbach's alpha coefficient
E-learning Motivation	Maldonado *et al*(2010).	7	0.81
Social Influence	Venkatesh *et al*(2003).	4	0.74
System Quality	Gu(2009)	3	0.84
Facilitating Conditions	Venkatesh *et al*(2003).	3	0.75
Perceived Benefits	Lee(2009).	3	0.73
Intention to use e-learning	previous application of TAM	3	0.72
Total		23	0.90

4-2- Modeling of Structural Equation:

In order to assess the causal relationship which was mentioned in assumptions, structural equation modeling is used. It should be mentioned that the structural modeling indices should be properly fit so that it can be confirmed. If the ratio of CMIN to degrees of freedom (df) is less than 5, RMSEA (Root Mean Square Error of Approximation) is less than 0.08, CFI (comparative fit index) more than 0.90 and PCFI (parsimony adjustment to the CFI) more than 0.05, it can be concluded that the model is properly fit. The fitness of initial model, based on fitness indices which are used in this study, is reported in Table 3. As can be seen in the table, the validity and fitness of the model is confirmed. Structural equation modeling diagram is also shown in figure 2.

Table 3: Indices of model fitness:

Fitness Indices	RMSEA	PCFI	CFI	CMIN / df
Pattern	0.07	0.672	0.967	1.89
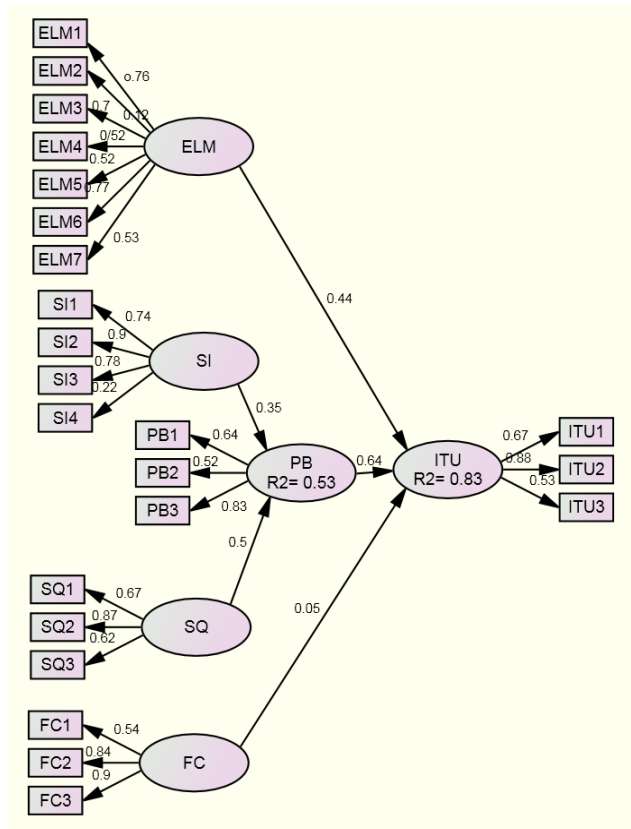
Fig. 2: Structural Equation Modeling

4-3- Results Analysis and Testing of Research Hypotheses:

Initial analyses of the mean and standard deviation of each variable are shown in Table 4. As can be seen, the variables of perceived benefits and motivation, with a mean of 3.73 have the highest mean among the research variables.

Table 4: The mean and standard deviation of variables:

Variable	Mean	Standard Deviation
Social Influence	3.05	0.754
System Quality	3.47	0.810
Perceived Benefits	3.73	0.821
E-learning Motivation	3.73	0.636
Facilitating Conditions	3.63	0.947
Intention to use e-learning	3.66	0.842

Now it is possible to evaluate direct and indirect effects of each independent variable on dependent variable. Each variable has two kinds of effect, direct and indirect, that from their collaboration the overall effect of variable is obtained. Direct, indirect and overall effects of research's independent variables on loyalty are reflected in Table 5. As β coefficients are used in analysis and as these coefficients are standardized, thus, the effect of different variables on each other can be determined.

Table 5: The influence of research variables on intention to use:

Variable	Standardized indirect effect	Standardized direct effect	The total effect
Social Influence	-0.120	0.324	0.204
System Quality	0.006	0.223	0.229
Perceived Benefits	0.643	0.000	0.634
E-learning Motivation	0.441	0.000	0.441
Facilitating Conditions	0.053	0.000	0.053

Related to the first hypothesis, we have (β= 0.229 and P > 0.05), therefore, the social influence positively influences the perceived benefits (the first hypothesis), on significant level of 95% is not acceptable (as here P=0.052, it can be said that at confidence level of 94% this hypothesis is acceptable). Related to the second hypothesis, β= 0.204 and P < 0.05, thus, the second hypothesis that is based on impact of system quality on students' perceived benefits is acceptable. In third hypothesis we have β= 0.643 and P < 0.05, thus, this hypothesis that is: the perceived benefits positively influence the intention of students to use virtual education, is accepted. Related to the fourth hypothesis that is based on positive effect of students' tendency towards e-learning on their intention to use virtual education, we have β= 0.441 and P= 0.05, therefore this hypothesis is also accepted. For the last hypothesis β= 0.053 and P= 0.05, thus we cannot say that facilitating conditions has positive effect on students' intention to use virtual education and this hypothesis is rejected. Since perceived benefits and motivation have the greatest influence, this question arises that whether it can be said that the influence of motivation on intention to use virtual education is greater than the influence of perceived benefits? To answer this question, Critical Ratios for Differences between Parameters, was used for analysis, that in the case of these two parameters this value is - 0.093, and with regard to this issue that the absolute value of this amount is less than 1.96, therefore, difference between the influence of motivation and perceived benefits on the intention to use virtual education is not significant and it cannot be said that the influence of one is more than the other.

Table 6: The results of structural equation:

	Hypotheses	S.E.	C.R.	P	Result
H1	Social impacts → perceived benefits	0.454	1.946	0.052	rejected
H2	System quality → perceived benefits	0.149	3.894	***	accepted
H3	System quality → perceived benefits	0.207	3.572	***	accepted
H4	Motivation → Intention to use	0.315	2.071	0.038	accepted
H5	Facilities condition → Intention to use	0.061	0.647	0.518	rejected

5- Conclusion and Recommendations:

Different types of educations always have been improved by technologies, especially computers and related information technology networks. Studies have shown that learning through web can be more effective (Tzeng, 2007). In this study, the variables affecting the Intention to use of e-learning were evaluated and the influence of such variables as motivation, facilitating conditions and social influence which were suggested in previous studies along with two new variables, system quality and perceived benefits, were analyzed so that the influence of these variables on the use of e-learning can be determined. Based on results the first hypothesis was rejected and the second one was accepted, and this was similar to Gu *et al* (2009) research which suggested system quality is effective on perceived benefits while social influence have no effect on perceived benefits; however, social influence with the confidence level of 94% in this study, also affects the intention to use that indicates the influence of teachers, parents and other people's opinions on using e-learning. Kim *et al* (2010) and Cheng *et al* (2011), also in their studies have shown that social influence are effective on intention to use. The third, fourth and fifth hypotheses made it clear that motivation and perceived benefits can influence students' intention to use e-learning but facilitating conditions have no effect; Maldonado *et al* (2010) in their study suggested the same result since their findings also showed that motivation influence the intention to use while facilitating conditions have no effect. Gu *et al* (2009) and Chi Lee (2009) also indicated that perceived benefits can influence the intention to use. Based on the findings some recommendations are suggested:

 To develop electronic government and citizen, egovernment learning should be used. E-government learning refers to the use of web-based technologies by governments for the benefits of the citizens (Shyu and Huang, 2011). This definition includes government websites and public portals which have educational contents.

 Elearning should be improved by adding learning through mobile phone, since learning through mobile may be more important. Leading institutions of learning have realized that they need to use SMS to keep in touch with students. Nowadays everything is changing quickly, for example, people in their travels have with them such new instruments as tablet or ipad, and thus there is no need to bring a laptop (Quinn, 2011). Electronic equipments for e-learning need a fixed location that is in contrast with the youth characteristics and is assumed as a limitation for them (Chunningham, 2007), while learning by mobile phone requires no special tool or equipment.

Bell (2007), believes that e-learning in future undoubtedly will form the basis of learning and development in organizations and will help to achieve the skills necessary for economic prosperity. Despite many advantages, e-learning also has some limitations. For example, group collaboration and breakthrough is an important issue which should be resolved. Where face to face interaction with students is impossible for teacher, assessment becomes difficult, since assessment is important both for teachers and learning process (Chang and Chen, 2009). It is suggested that a future research should be done in connection with this limitation. Extension of e-learning has provided facilitating for learning which have caused changes in education. These changes not only have influenced educational institutions but also organizations (Rosenberg, 2001), and it is recommended that researchers evaluate the effect of this issue on organizations' performance and progress.

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