# Presenting the causal model of psychological variable (Computer experience, Subjective norm, Computer anxiety and Computer self efficacy) on actual use of information technology on the basis of Davis's model

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**Abstract:** Accepting and proper using of technology is as important as the technology and having knowledge about the influential factors on information technology enables us to predict the amount of using technological tools. One of the causes of the low rate of using technology is the lack of adequate research in this field. Based on this factor, the present study investigate the effect of psychological variables (computer experience, computer anxiety and computer self-efficacy) on the actual use of information and communication technology (ICT). The population of this study consists of virtual university students in Iran. 561 students are chosen by Krejcie and Morgan formula. After collecting data by standard questionnaires, to assess the relationship between variables, path analysis used as the statistical procedure and this is done by AMOS software. Finally, the proposed model is fitted with the data and the results show that all the variables have a meaningful and direct effect on each other except the impact of computer anxiety on the actual use which is inverted (negative).

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## Introduction

Technology acceptance model has been designed in North America and is used in many researches such as Shin et al (2009), Vankatesh & Davis (2000), and Tselios et al (2011), and gradually has acquired the necessary credit in other countries. A study by Legris et al (2003) indicates that technology acceptance model could predict 40% of the factors that affect the use of information technology and it is recognized as a useful theoretical model for understanding and explaining the behavior of information technology usage.

Technology Acceptance Model as a scientific model includes variables such as perceived ease of use, perceived usefulness, attitude and behavioral intention. And it could be a general model for the application of information technology in many communities (Dillon & Morris, 1996).

Yang (2007) in a research titled as "The Effect of Technology Acceptance on Undergraduate Students Usage of WEBCT as a Collaborative Tool" Showed that there is a significant relationship between perceived ease of use, perceived usefulness and computer self-efficacy with attitude and actual use of computers. But there is not a meaningful and significant relationship between subjective norm and actual use. Research results also showed that subjective norm and computer self-efficacy have direct effects on perceived ease of use. Moreover, the results of a survey by Tselios et al (2011) among university students in Greece was showed that perceived usefulness and perceived ease of use of IT

systems have direct effect on attitude among students. Also in this study, the relationship between perceived ease of use and perceived usefulness reported to be meaningful. Research results of Kulviwat et al (2006), Ried (2008), and Porter et al (2006) indicates that perceived ease of use and perceived usefulness have direct and significant effect on attitude. Also Park (2007), Porter et al (2006), and Mayorga (2010) reported a significant relationship between attitudes and actual use.

Saadé and Kira (2009), in a study titled "Computer Anxiety in E-Learning: The Effect of Computer Self-Efficacy" Showed that computer selfefficacy has a direct and significant impact on students' perceived ease of use. Moreover, There is a direct relationship between computer anxiety and computer self-efficacy.

In another research by Teo et al (2007) perceived usefulness, perceived ease of use, and subjective norms are introduced as the factors which are influential on attitude. Also in this study the direct effect of subjective norm and perceived ease of use on perceived usefulness were explained.

Delice (2009) showed that computer experience has a significant and direct effect on subjective norm, computer self-efficacy and actual use. Also, there is significant relationship between subjective norm and three variables named perceived usefulness, perceived ease of use, and actual use. And finally there is a significant relationship between computer anxiety and actual use. Sen (2005) showed that computer selfefficacy and subjective norms have direct and meaningful effect on two cognitive elements of TAM named perceived ease of use and perceived usefulness. This research also indicates that these two elements have significant effect on attitude. And also there is a significant relationship between attitudes and actual use.

Fagan et al (2004) according to social cognitive theory found that, computer experience has a direct and significant effect on computer selfefficacy. In this study computer self-efficacy has a negative relationship with computer anxiety, and a positive relationship with actual use. Also the results of this research indicate that computer experience has a positive relationship with actual use, and a negative relationship with computer anxiety. In a study by Igbaria et al (1995) titled "The Effects of Selfefficacy on Computer Usage" he showed that computer anxiety through perceived usefulness has an indirect effect on actual use. Moreover, perceived usefulness and perceived ease of use have a significant effect on actual use. In addition, the results of a research by Yusoff (2009) showed perceived ease of use and perceived usefulness have direct and significant effects on actual use.

# 2. Research Methodology

Research method of this study is correlation and 436 students of virtual university in Iran are selected by stratified sampling. Measurement tool in this research standardized questionnaires of perceived ease of use, perceived usefulness and attitude (Teo et al, 2007), subjective norm and computer experience (park, 2003), self-efficay (Wolters and Daugherty, 2007), and computer anxiety questionnaire (Ball, 2008), and data analysis software that is used is AMOS 18. In this study, to evaluate the reliability of questionnaires Cronbach's Alpha is used which indicated in Table 1.

# Results

Considering that the correlation matrix is the basis for analysis in casual modeling, correlation matrix of variables with correlation coefficients and their significance levels are presented in Table2.

According to correlation matrix, the most meaningful correlation is related to computer self efficacy and perceived usefulness and the least correlation is related to perceived usefulness and actual use. It should be noted that among the variables of this study, only the correlation of computer anxiety with the other variables are inversed. Direct, indirect and total effects of variables are presented in Table 3.

According to Table 2, subjective norm  $(\beta=0.113, t=2.335, P=0.01)$ , perceived ease of use (β=0.206, t=4.224, P=0.01), perceived usefulness  $(\beta=0.238, t=4.761, P=0.01)$ , attitude  $(\beta=0.250, t=0.250)$ t=5.129, P=0.05), computer anxiety( $\beta$ = -0.214, t= -4.553, P=0.01), computer experience ( $\beta$ =0.256, t=5.415, P=0.01), and computer self-efficacy  $(\beta=0.206, t=4.141, P=0.01)$  have significant and direct effect on actual use. Subjective norm ( $\beta$ =0.160, t=2.965, P=0.01), perceived ease of use (β=0.191, t=3.530, P=0.01), perceived usefulness ( $\beta$ =0.171, t=3.061, P=0.01) and computer self efficacy  $(\beta=0.185, t=3.385, P=0.01)$  have significant and direct effect on attitude.perceived ease of use (β=0.158, t=2.977, P=0.01) ,subjective norm  $(\beta=0.191, t=3.635, P=0.020)$  and computer self efficacy (B=0.139, t=4.549, P=0.01) have significant and direct effect on perceived usefulness. Subjective norm ( $\beta$ =0.140, t=2.573, P=0.01) and computer selfefficacy (B=0.154, t=2.833, P=0.01) have significant and direct effect on perceived ease of use. Computer experience ( $\beta$ =0.115, t=2.089, P=0.037) have significant and direct effect on subjective norm. Computer experience ( $\beta$ =0.134, t=2.441, P=0.015) and computer anxiety ( $\beta$ = -0.157, t= -2.862, P=0.01) have significant and direct effect on Computer self efficacy.Computer experience ( $\beta$ = -0.130, t= -2.361, P=0.018) have significant and direct effect on computer anxiety.

Fitted indices (*GFI*), (*AGFI*) and (*CFI*), respectively (0.992), (0.963) and (0.986) indicate that the fitness of model is very high. The *RMSEA* value is equal to 0.034 so characteristic of reported fitness indicate that model has a good fitness with the data.

# Discussion

Results showed that computer experience and computer anxiety have direct and significant effect on actual use. This result is consistent with research results of Fagan (2004) and Dlice (2009). In addition to the above mentioned researches, the relationship between computer anxiety and actual use is reported to be significant in a study by Igbaria (1995). The results also showed that there is a significant relationship between subjective norm and actual use (Dlice, 2009), and also a significant relationship between computer self-efficacy and actual use (Fagan 2004, Yang 2007). But Young (2007) in his study found that the relationship between subjective norm and actual use is not meaningful that is inconsistent with the results of this research. The study reported a significant relationship between attitudes and actual use and this finding is aliened with the research results of Mavorga 2010, Park 2007 and Porter et al 2006.In this study perceived ease of use and perceived usefulness have

significant effect on actual use and the findings of Yusoff (2009), Igbaria (1995), Yang (2007). Moreover, perceived usefulness and perceived ease of use has significant and direct effect on attitude, and this is consistent with the research results of Kulviwat et al 2006, Reid 2008, Porter et al 2006, Teo 2007, Tselios et al 2011, Yang2007, and Sen 2005. This study showed that subjective norm has a significant relationship with attitude; this is confirmed by Teo (2007) and rejected by Yang (2007).

The study results showed that attitude has a direct effect on self-efficacy and this is supported by Yang (2007). Subjective norms, computer self-efficacy, and perceived ease of use have significant effect on perceived usefulness, this finding is consistent with the result of the researches of Dlice(2009), Sen(2005), and Teo(2007).Computer self-efficacy and subjective norms have significant and direct effects on perceived ease of use. And in the researches that were done by Sen (2005), Yang (2007), and Dlice (2009), the relationship between these variables are confirmed.

It should be noted that the research results of Yusoff 2009, Kulviwat 2006, and Saadi 2009 also indicate a significant relationship between computer self-efficacy and perceived ease of use. In this study the direct effect of computer experience on computer self-efficacy and computer anxiety is determined.

And it is consistent with the findings of Igbaria (1995) and Fagan (2004). In addition, the findings of Dlice (2009) indicate that there is a significant relationship between computer experience and computer self-efficacy, and also between computer experience and subjective norm. And finally the present study showed that there is a significant relationship between computer anxiety and computer self-efficacy. This result is consistent with research results Saadi 2009, and Dlice 2009. Among the research variables, computer experience has the greatest effect on the learner's usage of technology. Therefore, it is recommended that during the course of study the skillful professors with experience in technology field employed to motivate students and they encourage them to greater use of technology. In addition, holding seminars and conferences with experts, can provide an opportunity to students to gain some experiences in this field.

Variables	Cronbach Alpha
Subjective norm	0.76
Actual Use	0.85
perceived ease of use	0.79
perceived usefulness	0.79
Attitude	0.81
Computer anxiety	0.87
Computer experience	0.79
Computer self efficacy	0.82

## Table 2: Correlation matrix of variables

Variables	1	2	3	4	5	6	7	8
Actual Use	1							
Computer experience	.252**	1						
Computer self efficacy	.206**	.114*	1					
Subjective norm	.189**	.115*	.009	1				
attitude	.248**	.052	.112*	.159**	1			
perceived ease of use	.258**	.035	.153**	.138*	.214**	1		
Computer anxiety	140*	130*	140*	012	122*	088	1	
perceived usefulness	.110*	.033	.265**	.171**	.127*	.168**	.087	1
P**<0.01 p*<0.05								

### Table 3: Direct, Indirect and Total Effect of Variables

Effect	Direct effect	Indirect effect	Total effect	T-Value	Explained total variance
Criterion: Actual Use					
Predictors: Subjective norm	0.113	0.113	0.224	2.335	
perceived ease of use	0.206	0.084	0.290	4.224	
perceived usefulness	0.238	0.042	0.280	4.761	
Attitude	0.250		0.222	5.129	
Computer anxiety	-0.214	-0.032	-0.246	-4.553	
Computer experience	0.256	0.066	0.322	5.415	
Computer self efficacy	0.206	0.133	0.339	4.141	
Criterion: Attitude					
Predictors: Subjective norm	0.160	0.058	0.218	2.965	
perceived ease of use	0.191	0.027	0.218	3.530	
perceived usefulness	0.171		0.133	3.061	
Computer self efficacy	0.185	0.069	0.254	3.385	

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Criterion perceived usefulness					
Predictors: perceived ease of use	0.158		0.146	2 977	
Subjective norm	0.191	0.022	0.213	3 635	
Computer self efficacy	0.139	0.022	0.263	4 549	
Criterion: perceived ease of use					
Predictors: Subjective norm	0.140		0.137	2.573	
Computer self efficacy	0.154		0.177	2.833	
Criterion: Subjective norm					
Predictors :Computer experience	0.115		0.115	2.089	
Criterion: Computer self efficacy					
Predictors : Computer experience	0.134	0.020	0.154	2.441	
Computer anxiety	-0.157		-0.168	-2.862	
Criterion: Computer anxiety					
Predictors : Computer experience	-0.130		-0.129	-2.361	

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