A PARSIMONIOUS ADOPTION MODEL FOR THE EDUCATIONA ENVIRONMENT E-SERVICES USABLE FOR IT MANAGERS

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ABSTRACT

Abstract: Societies are changing, as new electronic services are introduced with a rapid pace. Th real challenge for the implementers of these services is to have enough users. It is obvious that an e-Service without users would be a failure. Users adoption to an innovation is very important for the researchers. There are many factors which might influence on the users' intention to use an e-Service and finding these factors is the researchers goal. There are several models to be consider as the adoption model for the new services but implementers are not sure which model is best for their environment. This study tries to find the most influencing adoption factors and will propose and test an adoption model for an educational environment.   Qualitative (Interviews) and quantitative (questionnaires) are used to find the important factors influencing the adoption of users. This study is performed in Islamic Azad University-Dehaghan branch between December 2013 and January 2014. First, information Technology managers involving Information Services development were interviewed to find the most influencing factors from the literature review. Second, the proposed model was tested and at last the final adoption model of the study is proposed. This model has one dependent and three independent variables. "Perceived Usefulness", "Observability", and "Compatibility" were the three independent factors. The dependent factor is "Intention to Use". Considering the three important factors of this study would help the implementers of e-Services in education centres in the similar environments, and they can introduce more successful e-Services

INTRODUCTION

Users' Adoption to a technology is becoming a critical issue in societies. This issue is becoming more important in developing countries as these countries have to use innovations that are not developed inside their countries and the cost of these technologies are not low (Carter & Belanger 2005). Therefore, organizations' managers must be careful when they want to implement new technologies. If they want to enjoy the benefits of new technologies, they must consider their users behaviors and they have to be aware about the factors that have impact on their adoption. Several adoption models has been introduced by the researchers all over the world but none of them has been known as a standard adoption model. User's behaviours are dissimilar as their environment, culture, and other conditions are different. Many adoption model comprising several factors were introduced by the researchers but we are still try to find better model for a specific technology.

Universities are implementing e-Services and they want to increase users' number of the e-Services, therefore they need to understand user's behavior and predict how they adopt to a technology. It is very important for an e-Service to have enough users and this is a key issue for a system to be successful (Davis, 1989). The largest university in Iran is implementing several e-Services for both their students and stuffs. This study is trying to find important adoption factors for the e-services of an education system. Moreover, by comprising these

factors an adoption factor will be introduced. This study is trying to use only the most important factors and to present a parsimonious model.

Students and staffs are using e-Services in the university and several new e-Services are being implemented and developed inside the university. One of the issues that must be considered before implementation of the services is the usage rate of the services. Therefore, using adoption models to predict and explain the users behavior is important for the IT managers. This study uses TAM as a model that has been used and tested by many researchers and will integrate it with other important factors. These factors will be revealed by interviewees.

LITERATURE REVIEW

While new technologies are rapidly introducing and these technologies have different characteristics and moreover every society has its own (and sometimes unique) situation, study about the users' needs and their behavior are very essential for the implementers of these new technologies. There is a need to introduce prudent adoption model for these technologies (Carter & Belanger 2005).

While introducing TAM, Davis proposed two factors as the factors that can explain the usage of a system (Davis, 1989) and these factors are perceived ease of use (PEOU) and perceived usefulness (PU). Many researchers have used TAM and other related models to examine adoption of new technologies (Orgeron, 2008). It has been proven that TAM is useful to explain users' intention to use a technology (Legris et al. 2003).
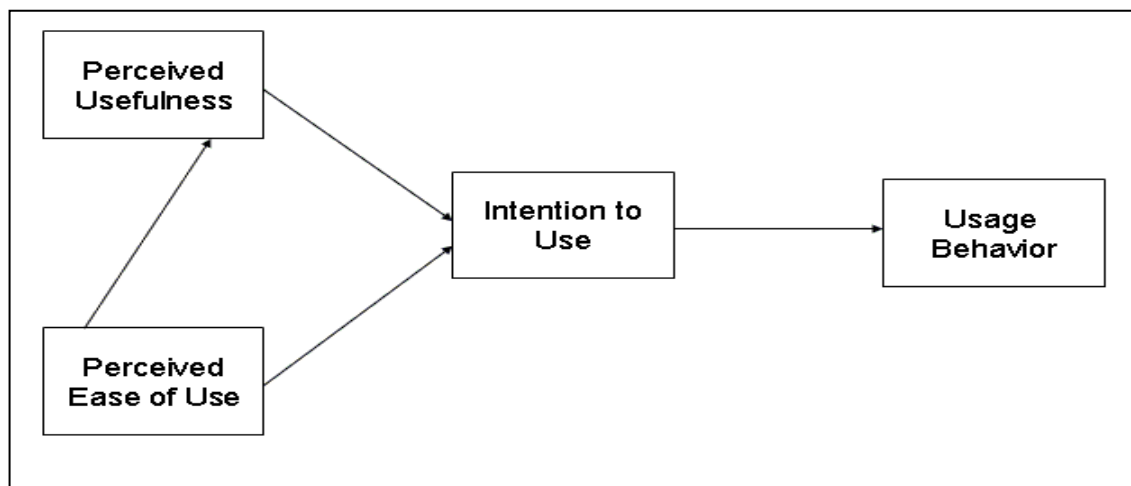

Figure 1. Technology Acceptance Model (Davis, 1989)

However, there are several theories used to explain the users adoption, Technology Acceptance Model (TAM) is one of the most used theory to predict users behavior (Shajari and Mehrabani, 2015). This model was proposed by Davis in 1989 with two main factors: Perceived usefulness and perceived ease of use (Figure 1). Perceived usefulness is "the belief that using a particular system would enhance one's job performance" (Davis, 1989). Perceived ease of use was defined as "one's perceptions of the amount of effort required to use the system" (Davis, 1989, Venkatesh V. et al, 2003). TAM specify that these two factors directly will impact on the intention to use (ITU) a system.

Another model which is used to specify adoption of a system was introduced by Rogers. He named it diffusion of innovation (DOI). DOI (Figure 2) have five constructs: Relative advantages, complexity, compatibility, trialability and observability (Venkatesh V. *et al*, 2003). Two first factors in this model show the same concept that has been used in TAM.
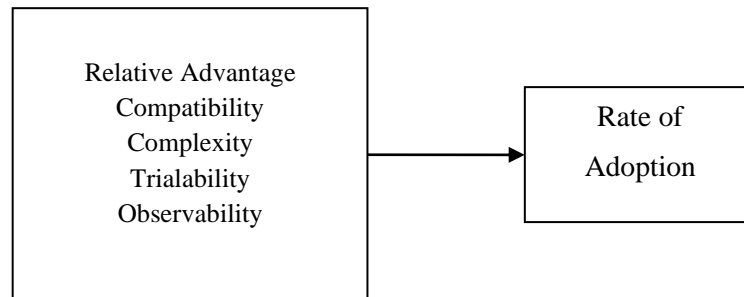

Figure 2. Diffusion of Innovation (Rogers, 2003)

In the year 2003 another adoption model was presented by Venkatesh et al. (Orgeron, 2008) which is the Unified Theory of Acceptance and Use of Technology (UTAUT) and consist of three factors (effort expectancy, performance expectancy and social influence) with direct effect on the usage intention (Figure 3). In this model there are two constructs with the same concept as TAM and DOI which are effort expectancy and performance expectancy.
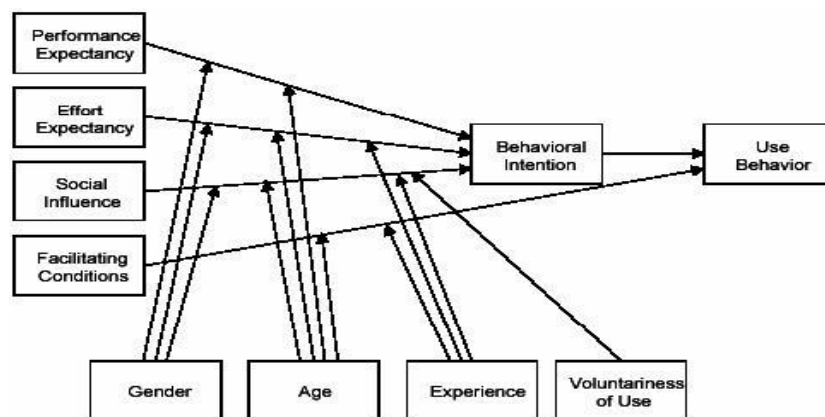

**Figure 3. Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)**

3. Research Objective

The research main objectives are: (1) To bring out important adoption factors in an educational environment; (2) To present an adoption model for an educational environment.

This is done by examining TAM and several related adoption factors, introduced in previous years.

4. Proposed Model

Based on the literature review and an qualitative research an adoption model is proposed for Islamic Azad University as an educational environment in Iran (Shajari and Mehrabani, 2015). The model is presented in Figure 4. The model has a dependent variable (DV) which is intention to use and four independent variables from previous known adoption models. These factors are perceived ease of use, perceived usefulness, observability, and compatibility.
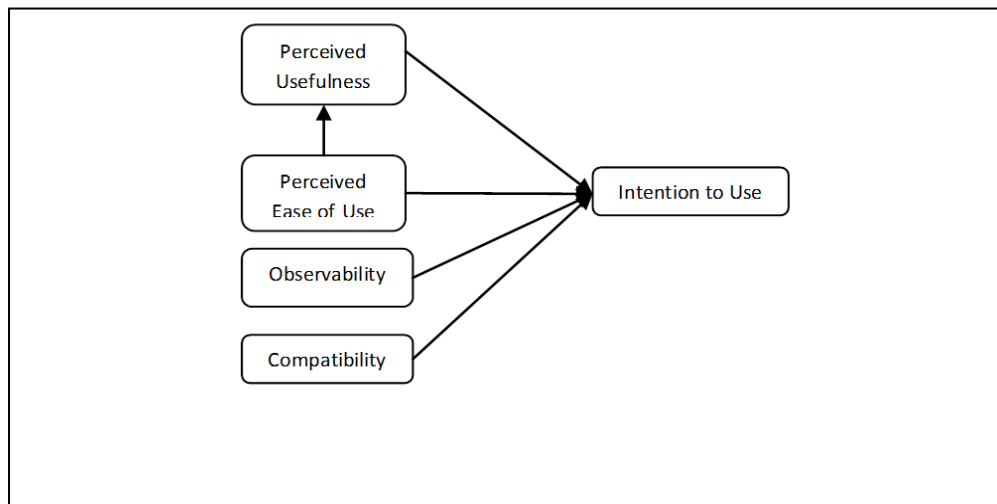
Figure 4. Proposed Model

The most important factors are: Perceived Ease of Use (Complexity, Effort expectancy), Perceived Usefulness (Relative Advantages, Performance Expectancy), Observability, and Compatibility. These four factors can be used to make the proposed adoption model. Complexity from DOI, "Perceived Ease of Use" from TAM and Effort expectancy from UTAUT determine a similar concept. Furthermore, Relative Advantages from DOI, "Perceived Usefulness" from TAM and performance expectancy from UTAUT present the same concept too. Therefore, these factors were put in the same category. One dependent variable (Intention to Use) and four independent variables (Perceived Ease of Use, Perceived Usefulness, Observability, and Compatibility). The definitions of these factors are presented in Table 1.

Table 1. . Factor Definitions

	Variable	**Definition**
1	Perceived Ease of Use	The degree to which a person believes that using a particular system would be free of physical and mental efforts.
2	Perceived Usefulness	The degree to which a person believes that using a particular system would enhance his or her job performance.
3	Observability	The degree to which the results of an innovation are visible to others.
4	Compatibility	The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopter.

These constructs influence one's behavioral intention to use a system, which, in turn, determines actual system usage (Rogers, 2003).

RESEARCH METHODOLOGY

Quantitative research method is used to test the proposed adoption model. Data gathering has been done December 2013 to January 2014. After designing the measurement model, the constructs were tested for item analysis. The researchers were looking for any irrelevant items in the model. Therefore, each variable was tested separately to be prepared for the model fit analysis. There are diagnostic indicators in SEM, which can show the analyzer how to improve the model by improving the model fit indices. To test the model, this study used AMOS 8.0, which is provided as an additional software package for SPSS users.

RESULTS

This study uses a tester model to examine the proposed model. The tester model (Figure 5) is regularly tested by Confirmatory Factor Analysis (CFA) (Teo, 2011). To test the model, this
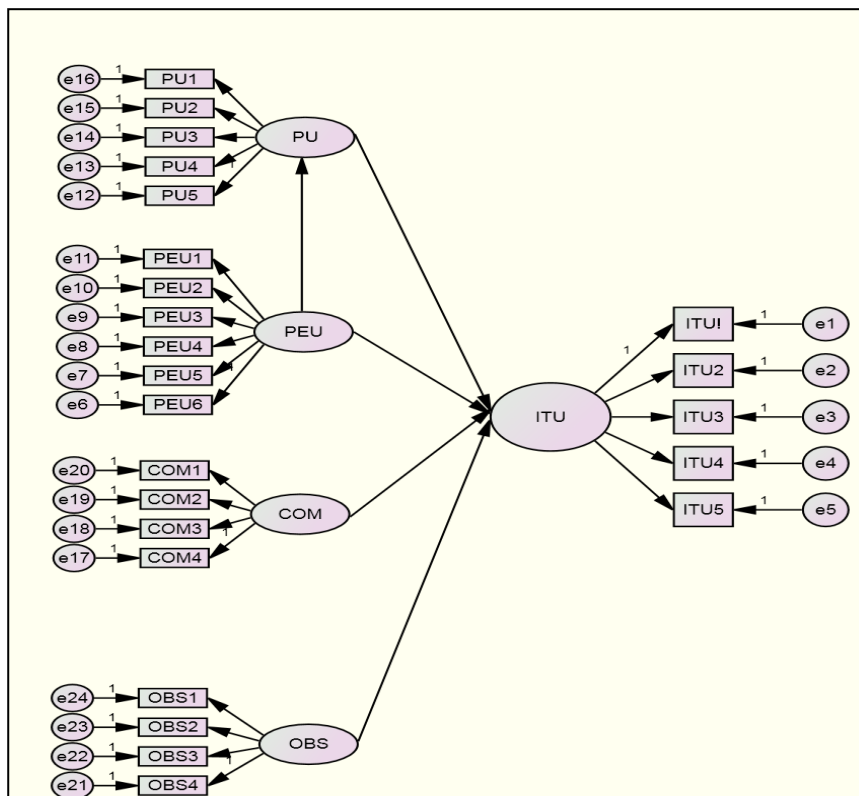

Figure 5. Tester Model

study used CMIN/df, AGFI, RMSEA, CFI, and TLI indices. The Model fit indices values can be seen in Table 2. Two factors needed modifications which were PEU and OBS.

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Table 2. . Model fit Indices Values

	CMIN/df	p-Value	AGFI	RMSEA	CFI	TLI
ITU	1.658	0.141	0.965	0.049	0.989	0.978
PU	1.289	0.265	0.973	0.032	0.994	0.988
PEU	4.619	0.0	0.878	0.115	0.856	0.760
PEU (Modified)	0.629	0.678	0.986	0.0	1	1.029
COM	1.88	0.153	0.967	0.057	0.995	0.985
OBS	16.341	0	0.696	0.237	0.813	0.438
OBS (Modified)	0.382	0.537	0.993	0	1	1.023

For a good model fit values, it is recommended that the normal Chi-Square (CMIN/df) to be
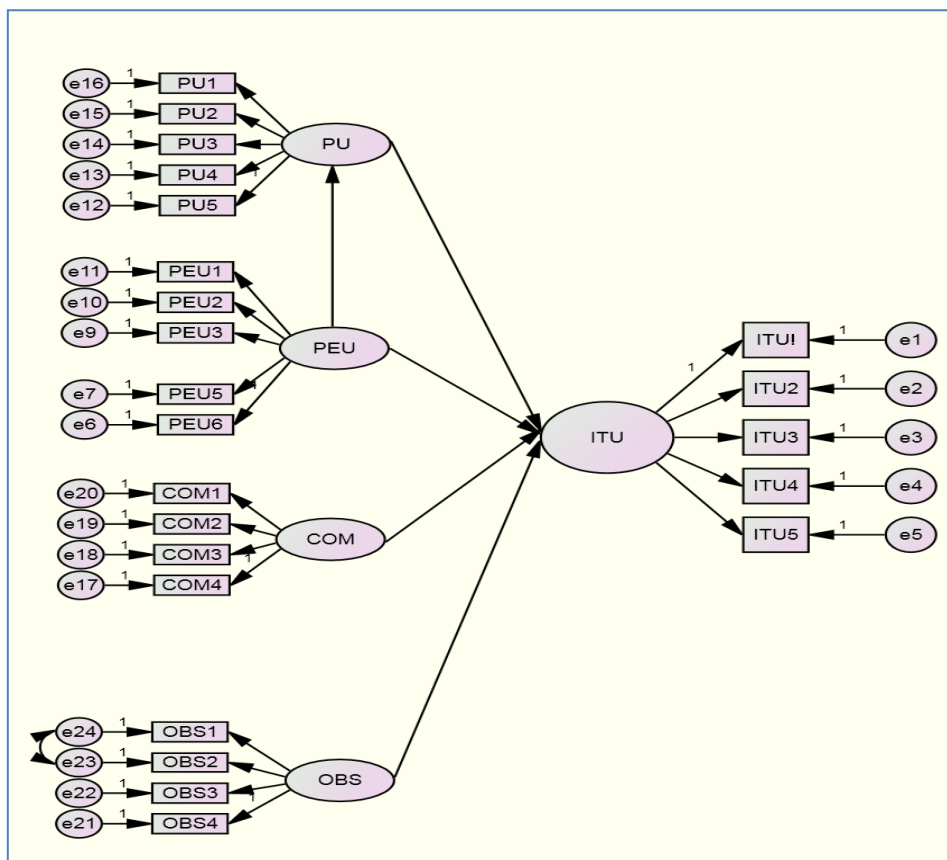
Figure 6. Modified Model

less than 3, and TLI, AGFI and CFI are all more than 0.9. Also, a good value for RMSEA is a value less than 0.08. The modified model is presented in Figure 6. This model is ready to be tested for the model fit values.

The values for the model fit are illustrated in Table 3.

Table 3. Model Fit Indices after modification

RMSEA	TLI	CFI	P-Value	CMIN/df
0.069	0.819	0.843	0.0	2.323

As it is presented in Table 3, all model fit values are good, therefore the model is appropriate for the further analyses.

SUMMARY AND CONCLUSIONS

Introducing an adoption model for different environments is one of the key issues for the researchers. In this study, an adoption model for an educational environment was presented. This model was based on a qualitative study which was performed in advanced. As the second phase of a larger study, we tested our model and modified it. This model is ready for the final step of the analyses. It is recommended for the other researchers to use and test this model for electronic services in other educational environments.

REFERENCES

[1] C. Orgeron P. "Evaluating Citizen Adoption and Satisfaction of e-Government in Mississippi", Political Science and Public Administration. Mississippi State University: Mississippi State, Mississippi, pp 170, 2008.

[2] E. Rogers M," Diffusion of Innovations", New York: Free Press, 2003.

[3] F. Davis D, "Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology", MIS Quarterly. Vol. (13), pp 319-330, 1989.

[4] L. Carter, F. Belanger, "The Utilization of E-Government Services: Citizen Trust, Innovation and Acceptance Factors". Information Systems Journal, Vol. 15(1): pp. 5-25, 2005.

[5] M. Shajari , and S. Ebrahimi M., "A Preliminary Qualitative Study Towards the Development of an Adoption Model", Journal of Scientific Research and Report, Vol. 4(4), pp 375-381, 2015.

[6] P. Legris, J. Ingham, P. Collerette, "Why do people use information technology? A Critical Review of the Technology Acceptance Model", Information & Management. Vol. 40(3), pp191-204, 2003.

[7] V. Venkatesh, M. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information technology: Toward a Unified View". MIS Quarterly; Vol. 27(3), pp 425-478, 2003.