Computer and Information Science; Vol. 9, No. 1; 2016
ISSN 1913-8989 E-ISSN 1913-8997
Published by Canadian Center of Science and Education

An Integrated Expert User with End User in Technology Acceptance Model for Actual Evaluation

Hussain Mohammad Abu-Dalbouh[1]

[1] Computer Science Department, Qassim University, Al-Qassim, Kingdom of Saudi Arabia

Correspondence: Hussain Mohammad Abu-Dalbouh, Computer Sciences Department, Qassim University, Al-Qassim, Kingdom of Saudi Arabia. E-mail: hussainmdalbouh@yahoo.com

Received: November 19, 2015 Accepted: December 1, 2015 Online Published: December 20, 2015

doi:10.5539/cis.v9n1p47 URL: http://dx.doi.org/10.5539/cis.v9n1p47

Abstract

Effective evaluation is necessary in order to ensure systems adequately meet the requirements and information processing needs of the users and scope of the system. Technology acceptance model is one of the most popular and effective models for evaluation. A number of studies have proposed evaluation frameworks to aid in evaluation work. The end users for evaluation the acceptance of new technology or system have a lack of knowledge to examine and evaluate some features in the new technology/system. This will give a fake evaluation results of the new technology acceptance. This paper proposes a novel evaluation model to evaluate user acceptance of software and system technology by modifying the dimensions of the Technology Acceptance Model (TAM) and added additional success dimension for expert users. The proposed model has been validated by an empirical study based on a questionnaire. The results indicated that the expert users have a strong significant influence to help in evaluation and pay attention to some features that end users have lack of knowledge to evaluate it.

Keywords: acceptance, evaluation, expert user, end user, technology, model

1. Introduction

The expert user evaluation is usually a list of perceived problems or reservation regarding the usability of a technology, software, system and a list of recommendations for improvement. Involving a number of experts can assist in identifying whether potential problems are likely to exist, as individual expert opinion is not infallible.

(Davis, 1986; Davis 1989; Davis 1993; Davis, Bagozzi & Warshaw, 1989) introduced TAM, which is presented in Figure 1, for modeling user acceptance of information systems in 1986. TAM starts by proposing external variables as the basis for tracing the impact of external factors on two main internal beliefs, which are perceived usefulness and perceived ease of use, while perceived ease of use also affects perceived usefulness over and above external variables (Taylor & Todd, 1995). These two beliefs both influence users attitude toward using IS. Attitude toward using sequentially has influence on behavior intention to use, which is the key factor for determining actual conditions of system use, while belief of perceived usefulness also affects behavioral intention to use over attitude toward using (Taylor & Todd, 1995).

End users knowledge about evaluation factors is a very important element in continuous quality improvement of the new technology and system. Additionally, because of the increase in technology improvement and introduce new technology, the evaluation aspects and factors have changed over the time. For the reason that the Lack of knowledge to examine and evaluate some features in the system by the end users led to a fake evaluation about the acceptance of the new system or new technology that have introduced. Therefore the end users in many industries such as business, education, banking and health care face problems and difficulties to determine the strength and weaknesses of the new technology. This will affect to plan for improvement and modification that new technology have been introduced effectively and efficiency.

Expert user opinions and comments are a major source of ideas that influence to evaluate the content of the new technology and software. The rational legislator or decision-maker relies on evidence, and so is bound to be influenced by the views of the experts who present it. The expert can play a role in acceptance of new technology change, for instance by appearing as a feature in a system, software, or by being asked to investigate something that the end users cannot recognize it. This study proposes an expert users evaluation side by side

with end user evaluation for actual evaluation by modifying original Technology Acceptance Model.

2. Literature Review

Our literature review indicates that TAM would be valuable and useful for explaining or predicting user acceptance of new technology or system, particularly among students and executives in a university or business organization context and health care works as we can call all of them end users. However, the validity of the model has rarely been tested with expert user side by side with end user evaluation.

This study reveal that the almost professionals in their own professional contexts such as banking and finance employees, healthcare professional including physicians and nurses, attorneys or education staff in most, if not all, they have lack of knowledge to examine and evaluate some features in the system or technology (Hartwick & Barki, 1994). Due to some features just expert in information technology and software can evaluate it.

TAM starts by proposing external variables as the basis for tracing the impact of external factors on two main internal beliefs, which are perceived usefulness and perceived ease of use, while perceived ease of use also affects perceived usefulness over and above external variables. These two beliefs both influence users attitude toward using IS. Attitude toward using IS, sequentially has influence on behavior intention to use, which is the key factor for determining actual conditions of system use as shown in Figure 1.

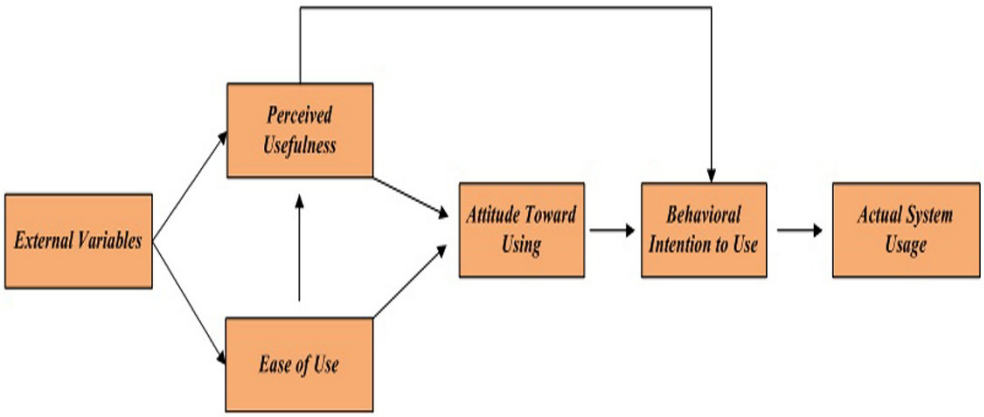

Figure 1. Original Technology Acceptance Model (TAM)

This study examined end users in a professional setting, (Physicians and Nurses, Banking workers and Education workers) for investigating the factors affecting them to evaluate acceptance of new technology that proposed to help them in their works. Choice of TAM over other IT acceptance/adoption models was made for the following reasons. First, TAM is general, parsimonious, IT-specific, and designed to provide an adequate explanation for and a prediction of a diverse user population's acceptance of a wide array of IT within various organizational contexts. Second, TAM has a well-researched and validated inventory of psychometric measurements, making its use operationally appealing. Finally, TAM is a dominant model for investigating user technology acceptance and has accumulated fairly satisfactory empirical support for its overall explanatory power, and has posited individual causal links across a considerable variety of technologies, users, and organizational contexts (Abu-Dalbouh, 2013; Chau, 1996a; Chau, 1996b; Davis, Bagozzi, & Warshaw, 1989; Mathieson, 1991; Vitalari, Venkalesh, & Cronhaug, 1985).

3. Expert Evaluation

Expert evaluation, also called heuristic evaluation, is a review of new technology or system by two or more usability specialists (Nielsen & Molich, 1990; Nielsen, 1994). Working independently, these experts use published research data, industry-accepted usability principles (heuristics) and best practices, and years of experience observing users in lab and field settings to evaluate the new technology or system and identify the strength, weaknesses and problems in that new technology or system. Expert user evaluators also can be walking through the new technology or system based on task scenarios, to assess work flow issues that the end user missed to observe and recognize it. Typical findings by expert evaluators include:

- ***What features of the new technology or system are likely to cause problems and should be improved.***
- ***What features are likely to be successful and should be retained.***

- ***What features should pay attention to it based on the importance of these features that the end users have some knowledge about it such as security, availability and maintainability.***

Therefore, expert users give the actual evaluation about the new technology or system more than the end users. The findings are assigned severity ratings and accompanied by actionable recommendations for improving the user experience of the new technology or system. According to the results we claimed that expert users identify a majority of the weakness and problems in the new technology and system, that behind the end users ability to discover it.

Expert users evaluators, regardless of their skill and experience, can only emulate users and not necessarily typical users of the new technology or system. Feedback from target users can add an important dimension to some expert evaluations for example, of alternative navigation approaches for an existing technology, or of a technology recently targeted to a new user audience. In these cases, list the priority of the features that the new technology or system should include based in the end users preferences. The experts may suggest solutions while end users probably do not.

In general, heuristic evaluation is difficult for a single individual to do because one person will never be able to evaluate all features in the new technology or system. Luckily, experience from many different projects has shown that different people find different usability problems. Therefore, it is possible to improve the effectiveness of the method significantly by involving multiple evaluators. As per Jakob Nielsen's study recommends, 3 to 5 expert user's evaluators.

4. Proposed Model

In this paper we seek for the possibility of creating a new model for evaluating new technology and system acceptance by involving expert user in evaluating process by applying the concepts of Technology Acceptance Model for End user to Expert users in order to get actual evaluation.

The TAM model is modified for this study to demonstrate how the proposed model can be beneficial for decision makers in organizations on evaluating the implementation of information systems and determining the strength and weaknesses of the new system/technology and plan for improvement and modification effectively and efficiency. By paying attention to expert user's opinions, comments and evaluate because it is a major source of ideas that influence to evaluate the content of the new technology and software.

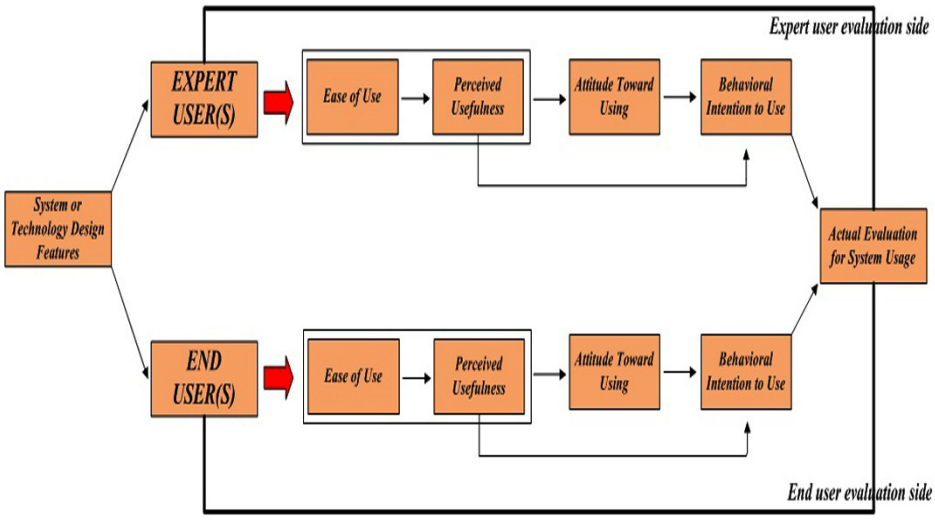

Figure 2. Proposed integrated expert user with end user in TAM model

5. Research Methodology

Regarding to the proposed model, preliminary refining of criteria has been done by the use of available literature reviews (Sureshchandar, Rajendran & Anantharaman, 2002; Yang, Jun & Peterson, 2004). The proposed model has been validated by an empirical study based on a questionnaire. Structured questionnaire was used for data collection to examine the three hypotheses in this study. The questionnaire was designed based on the proposed included expert users with end users for evaluation acceptance of new technology or system. The questionnaire consists of three dimensions.

The first dimension to examine the ***Hypotheses 1: (The end users do not know some features meaning in the new technology or system, or End-user has lack of knowledge of some features meaning in the new technology or system)***.

The second dimension to examine the ***Hypotheses 2: (The end users do not know how to evaluate some features in the new technology or system or End-user has lack of knowledge of how to evaluate some features in the new technology or system)***.

The third dimension to examine the ***Hypotheses 3: (There is a high impact and influence to include expert users in evaluation acceptance of new technology or system in order to get actual evaluation)***.

Several professors and IS professionals were interviewed to modify the items and the construction of the questionnaire. Completed responses to the questionnaire were received from 13 organizations, in both the public and private sectors. Then, a sample of 327 participants belonging to educational, healthcare and banking end users sectors selected randomly based on the important of these three sectors.

Questionnaire distribution and returns were by Email. The participants were asked to indicate the extent of their agreement with each element on a five-point Likert-type scale with anchors from "Very bad information, bad information, neutral information, good information, very good information" for the first two dimensions and from "Strongly agree" to "Strongly disagree" for the third dimension.

A total of 186 questionnaires were returned from respondents. Table 1 shows the distribution of the received sample according to gender (Men 58% and Women 42%. Majority of the respondents are from the 35-44 years age group (39%) and Health care sector (44%).

Table 1. Sample distribution

Variable		Frequency	Percentage
Gender	Female	78	42%
	Male	108	58%
Age	< 25	13	7%
	25-34	32	17%
	35-44	73	39%
	>45	68	37%
End-user Sector	Health care	82	44%
	Education	45	24%
	Banking	59	32%

4. Result and Discussion

One of the most important aspects in evaluating a theory is developing good criteria in order to achieve reliable and valid estimate from the mentioned structure. The demand to get actual evaluation in new technology or system has grown. It follows by the need to propose model that aims to include expert user in evaluation process. The proposed model has been validated by an empirical study based on a questionnaire. The end user proved that the need of including expert in evaluation. The results of the questionnaire demonstrate that end users in the sample have a lack of knowledge in some features meaning in the new technology or system because the majority of the answers for some of these features dimension charted less than the midpoints of their respective scales. It also, demonstrate that end users in the sample have a lack of knowledge to evaluate some features in the new technology or system because the majority of the answers for some of these features dimension charted less than the midpoints of their respective scales. As shown in table 2 and 3.

Table 2. Respondents Agreements for meaning of some features

Meaning of	Respondents Agreements Very good + Good information %
Availability	62.3%
Responsiveness	54.2%
Reliability vs. Cost of execution	38.4%
Flexibility	71.3%
Portability	67.4%

Security	63.6%
Maintainability	43.7%

Table 3. Respondents Agreements for evaluating of some features

Evaluating of	Respondents Agreements Very good + Good information %
Availability	56.3%
Responsiveness	48.3%
Reliability vs. cost of execution	36.4%
Flexibility	69.3%
Portability	66.8%
Security	58.3%
Maintainability	41.8%

The descriptive statistics for the third dimension questions revealed that end user trust in expert user evaluation results and they think expert user can be determining the strength and weaknesses of the new system or technology better than end users. Therefore the expert user evaluation has a strong significant influence in order to get actual evaluation. Table 4 shows the respondents agreements about expert user evaluation and Figure 3 shows the respondents agreements for all questions.

Table 4. Respondents Agreements about expert user evaluation

Influence to include expert users in evaluation	Respondents Agreements Strongly agree + Agree %
Do you trust in expert user evaluation results about new technology or system?	92.6%
Do you believe that expert user will see behind the end user can see in new technology evaluation?	89.7%
Do you think include expert user in evaluation will give actual evaluation for the new technology?	93.4%
Do you think expert user can be determining the strength and weaknesses of the new system or Technology better than end users?	87.9%

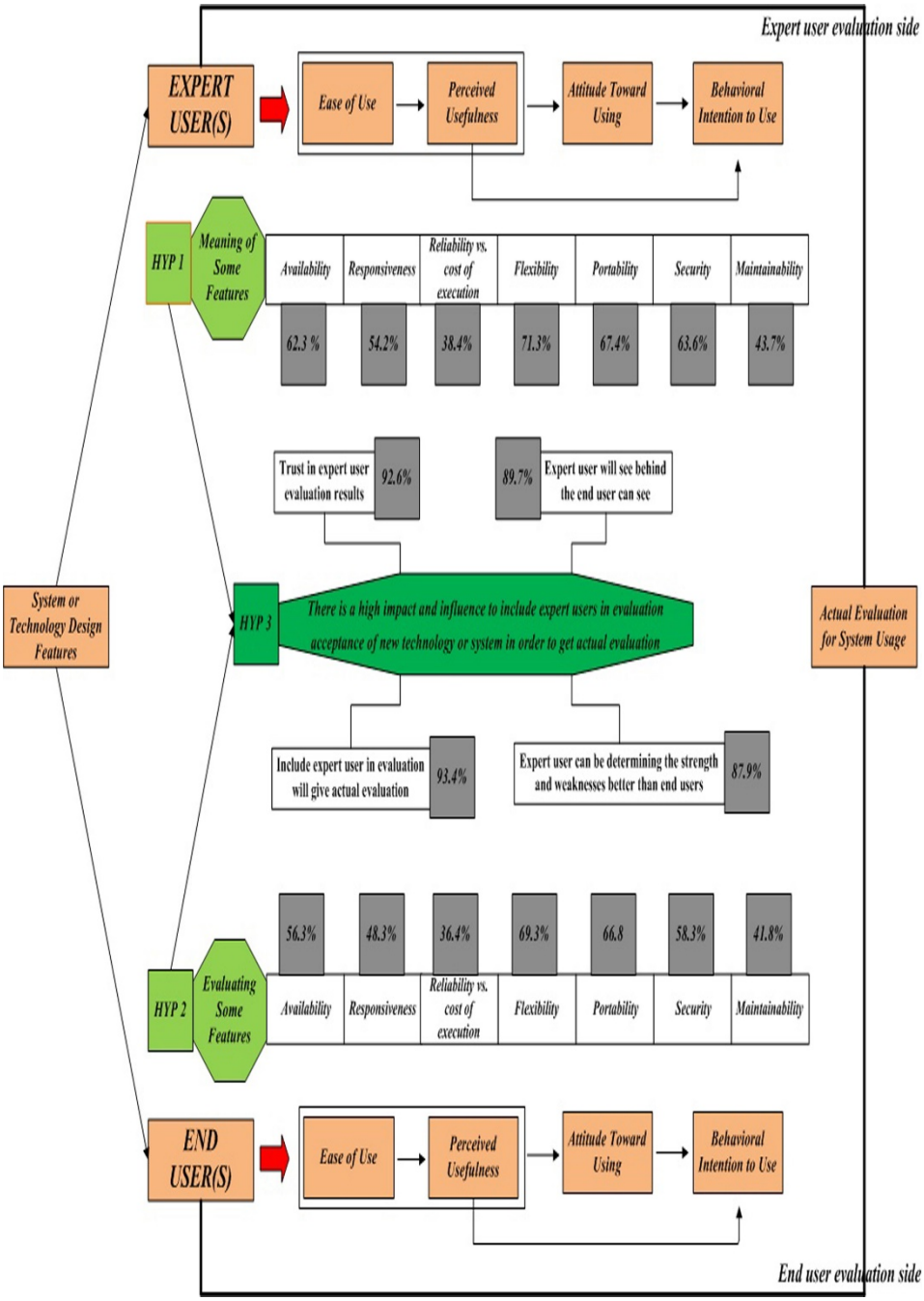

Figure 3. Respondents agreements

4. Conclusion

This paper proposed a new model for evaluating new technology and system acceptance by involving expert user in evaluating process by applying the concepts of Technology Acceptance Model for end users to expert users in order to get actual evaluation. Based on empirical findings, this study reached several conclusions. Results of the empirical analysis indicated that end users cannot evaluate all the features that included in the new technology or system and this led to give a fake evaluation results. There are high impacts and influence to include expert users in evaluation acceptance of new technology or system in order to get actual evaluation and the expert users give the actual evaluation about the new technology or system more than the end users. It also reveal the expert users identify a majority of the weakness and problems in the new technology or system, that behind the end users ability to discover it.

Acknowledgments

The author wish to thank Qassim University, Kingdom of Saudi Arabia. This work was supported in part by a grant from Deanship of Scientific Research, Qassim University.

References

Abu-Dalbouh, H. M. (2013). A questionnaire approach based on the technology acceptance model for mobile tracking on patient progress applications. *J. Comput. Sci., 9*(6), 763-770. http://dx.doi.org/10.3844/jcssp.2013.763.770

Chau, P. Y. K. (1996, September). An empirical investigation on factors affecting the acceptance of CASE by system developers. *Information and Management, 30*(6), 269-280.

Chau, P. Y. K. (Fall 1996). An empirical assessment of a modified technology acceptance model. *Journal of Management Information Systems, 13*(2), 185-204. Retrieved from http://hdl.handle.net/10722/177851

Davis, F. D. (1986). A Technology Acceptance Model for Empirically Testing New End-User Information Systems: *Theory and Results. Doctoral dissertation, Sloan School of Management., Massachusetts Institute of Technology*. Retrieved from http://hdl.handle.net/1721.1/15192

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319-339. Retrieved from http://www.jstor.org/stable/249008

Davis, F. D. (1993). User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioral Impacts. *International Journal of Man Machine Studies, 38*(3), 475-487. http://dx.doi.org/10.1006/imms.1993.1022

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989, August). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science, 35*(8), 982-1003). http://dx.doi.org/10.1287/mnsc.35.8.982

Hartwick, J., & Barki, H. (1994, December). Hypothesis testing and hypothesis generating research: an example from the user participation literature. *Information Systems Research, 5*(4), 446-449). http://dx.doi.org/10.1287/isre.5.4.446

Mathieson, K. (1991, September). Predicting user intention: comparing the technology acceptance model with theory of planned behavior. *Information Systems Research, 2*(3), 173-191. http://dx.doi.org/10.1287/isre.2.3.173

Nielsen, J. (1994). Heuristic evaluation. In Nielsen, J., & Mack, R.L. (Eds.), Usability Inspection Methods. *John Wiley & Sons*, New York, NY.

Nielsen, J., & Molich, R. (1990). Heuristic evaluation of user interfaces, *Proc. ACM CHI'90 Conf*. (Seattle, WA, 1-5 April), (pp.249-256).

Sureshchandar, G. S., Rajendran, C., & Anantharaman. R. N. (2002). Determinants of customer-perceived service quality: A confirmatory factor analysis approach. *Journal of Service Mark, 16*, 9-34.

Taylor, S., & Todd, P. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research, 6*(2), 144-176.

Vitalari, N. P., Venkalesh, A., & Cronhaug, K. (1985, May). Computing in the home: shifts in the time allocation patterns of households. *Communications of the ACM, 28*(5), 512-522.

Yang, Z., Jun, M., & Peterson, R. T. (2004). Measuring Customer Perceived Online Service Quality: Scale Development and Managerial Implication. *International Journal of Operational Production Management, 24,* 1149-69.