# Applied the Technology Acceptance Model in Designing a Questionnaire for Mobile Reminder System

Hussain Mohammad Abu-Dalbouh[1], Maryah Al-Buhairy[1] & Izdehar Al-Motiry[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

**Abstract**

Usability of software applications is a key to success of any system and the technology is best care because it is not susceptible to forget or to damage. The main aim of the proposed system application is to help two important categories of the society they are elderly and Alzheimer's patients, these two categories shared in one recipe which is a forgetful. Proposed application gives elderly and Alzheimer's patients an opportunity to have small memory which can help them to remember tasks, events, medications and people. It is a great opportunity to learn what makes a proposed application good. Which may contribute to the prevention of progression of the disease rapidly. In this study Technology Acceptance Model has been designed to investigate the end-user acceptance of designing Proposed Mobile Reminder System. The purpose of this study is to design a quantitative approach based on the technology acceptance model questionnaire as its primary research methodology. It utilized a quantitative approach based a Technology Acceptance Model (TAM) to evaluate the designing Proposed Mobile Reminder System. The related constructs for evaluation are: Perceived of Usefulness, Perceived Ease of Use, User Satisfaction and Attribute of Usability. All these constructs are modified to suit the context of the study. Moreover, this study outlines the details of each construct and its relevance toward the research issue. The outcome of the study represents series of approaches that will apply for checking the advantages of proposed system by helping the target groups to remember what they may forget, and helping care providers to save time and effort.

**Keywords:** elderly, Alzheimer's patients, methodology, TAM, reminder

## 1. Introduction

In recent years, emphasis on improving the quality of care provided by the hospitals has increased significantly and continues to gain momentum. In addition, the rapid expansion of mobile Information and Communications Technologies (ICT) within health service delivery and public health systems has created a range of new opportunities to deliver new forms of interactive health services to patients, clinicians, and caregivers alike.

Not taking prescribed medication and noncompliance can have serious health consequences. The reasons why people forget or don't take medications are varied. Maybe the doctor didn't explain how to take it properly. Maybe they feel better and think they don't need the medicine anymore. Elderly and Alzheimer's patients forgetting to take medications it is a common problem for them. Since elderly and Alzheimer's patients obliviousness causes social inconvenience and psychical complaint, they often forget daily schedules and miss their personal belongings such medication. Moreover, while barriers to medication adherence are complex and varied, but the most common reason cited by patients, Elderly and Alzheimer's patients, is that they simply forgot to take their medication.

This paper design a Technology Acceptance Model to investigate user acceptance of Mobile Reminder System. It proposes a quest methodology that being used to grasp the objectives and necessities, design, develop and at last, validate the projected application.

Research methodology is outlined as procedures, ways, strategies and techniques that square measure used to capture and gather all the specified data for the aim of the analysis issue. Methodology refers thereto branch of philosophy that analyses the principles and procedures of an inquiry during a specific discipline. it's usually a suggestion for determination a tangle that outlines specific components, example: Phases, tasks, methods,

techniques, tools and outputs. There square measure numerous ways that may be used in gathering data from totally different sources like sampling, website visits and observation of the study setting, questionnaires, interviews, prototyping and joint demand coming up with. These ways would be applied so as to validate and refine the projected hypothesis and arranged in line with structure of study. Thus, the study is organized specially to replicate the projected analysis methodology that may be applied to handle the projected analysis issue. Debates close the sphere of analysis reveal two main principal analysis categories: quantitative and qualitative. it's vital to notice that quantitative analysis has been related to the positivist stance whereas qualitative analysis with the informative stance (Creswell, 2011). However, qualitative and quantitative should not be thought-about substitutable to informative and positivist views severally. Additionally, the likelihood of qualitative and quantitative analysis to be either informative, positivist, or crucial are projected. Qualitative analysis could be a kind of analysis that produces findings not got wind of by suggests that of applied mathematics procedures or alternative suggests that of quantification and also the purpose behind the analysis is that the understanding of human expertise so as to reveal each the processes by which individuals construct which means regarding their worlds and to report what those meanings. A qualitative analysis is taken into account to be associate degree investigation method that explains social development through constructing, comparing, replicating, categorizing and classifying the item of the study. In alternative words, qualitative analysis worries with words instead of numbers (i.e., in knowledge that's not quantifiable). On the opposite hand, quantitative analysis is analysis that depends on developing metrics (numbers) that may be accustomed describe the phenomena (objects and relationships) below study. It is a deductive method (i.e., logic supported rules, models and laws) consisting of measure and analyzing the link between variables. This method reveals however typically or what percentage individuals act in an exceedingly specific approach however it fails to answer the question of "why". Table one shows the comparison between qualitative and quantitative analysis.

Table 1.Comparison between qualitative and quantitative research

| Qualitative | Quantitative |
|---|---|
| What is X | How many X |
| Inductive process | Deductive process |
| Sample is selective (non-random) | Sampling is random |
| Researcher looks for patterns, themes and concepts | Concepts and hypothesis are chosen before the research begins |
| Researcher develop a theory or compares patterns with other theories | Researcher use instrument to measure the variables in the study |

The 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, health care works and many fields as we can call all of them end users. The aims of this study is to design a quantitative approach based on the technology acceptance model questionnaire as its primary research methodology.

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 user's attitude toward using Information System (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.
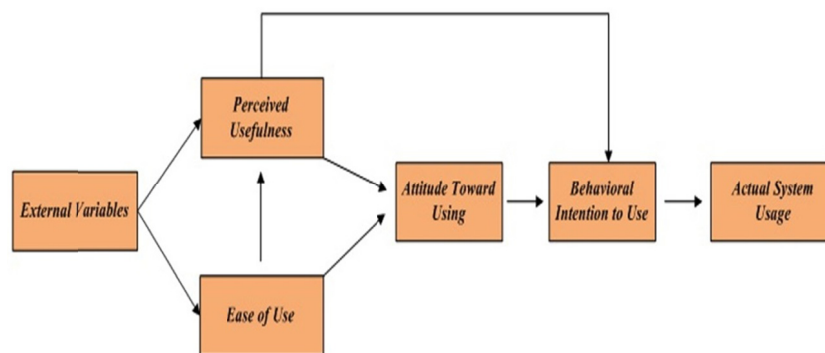


Figure 1. Original Technology Acceptance Model (TAM)

## 2. Materials and Methods

The decision of whether to carry out a qualitative or a quantitative approach lies on the researcher's assumptions (Kanaan, 2009; Abu-Dalbouh, 2013; Abu-Dalbouh, 2016). The present study relies quantitative approach and a form is employed for the aim of meeting the objectives of the study. We tend to pick for a quantitative because it helps to produce an outline of the trends in an exceedingly population or an outline of the relationships among its variables (Creswell, 2011; Abu-Dalbouh, 2013). Additionally to the present advantage, a quantitative is additionally cheap to be conducted and it's less time overwhelming because it allows the man of science to accumulate each quantitative scale and qualitative knowledge from an oversized analysis sample. For this reason, a form style in addition to measuring was used within the gift study to look at the variables within the adoption model and to realize analysis of mistreatment mobile reminder system. Moreover, a Likert scale is applied for each set of questionnaires. The likert scale is designed to examine how strongly subjects agree or disagree with statements on a five-point scale with the following anchors: (1) Strongly disagree, (2) Disagree, (3) Nature, (4) Agree, (5) Strongly agree (Chomeya, 2010; Abu-Dalbouh, 2013). In this study the proposed methodology was developed in five phases. For every phase has process step(s) and output for better understanding of what the main goal of every phase as presented in methodology section (Abu-Dalbouh, 2013).

Sampling Technique: Sampling is a procedure that entails utilizing a small number of units in a given population as a basis for drawing conclusions regarding the whole population (Jemain *et al*., 2007). The sample is considered as a subset of the population comprising of some members selected from it (Al-Omari *et al*., 2008). We aim to be able to draw generalized conclusions based on the population under study.

Analysis Techniques: There are three objectives of implementing data analysis: (i) getting overview for the sample data and its attributes, (ii) testing the goodness of data and (iii) validating the proposed hypotheses.

Variable Measurement: The methodology applied in the study is based on the questionnaire approach. The objective of the questionnaire approach is basically to evaluate the mobile reminder system. The questionnaire contains five sections: personal information, perceived usefulness, perceived ease of use, user satisfaction and attribute of usability. All these sections have a number of questions constructed to evaluate the effectives of the mobile reminder system model to the intended users.

## 3. Proposed Methodology

This methodology is developed primarily based upon a mix of the on the market literature and also the experiences of the author, who square measure actively attached the event of mistreatment mobile technology in health care business. Figure 2 shows the phases of a planned analysis methodology. The sequence of the phases is not rigid. Moving back and forth between totally different phases is usually needed. It depends on the end result of every section that section or that specific output of a section, should be performed next. The arrows indicate the foremost necessary and frequent dependencies between phases (Abu-Dalbouh, 2013; Abu-Dalbouh, 2016).
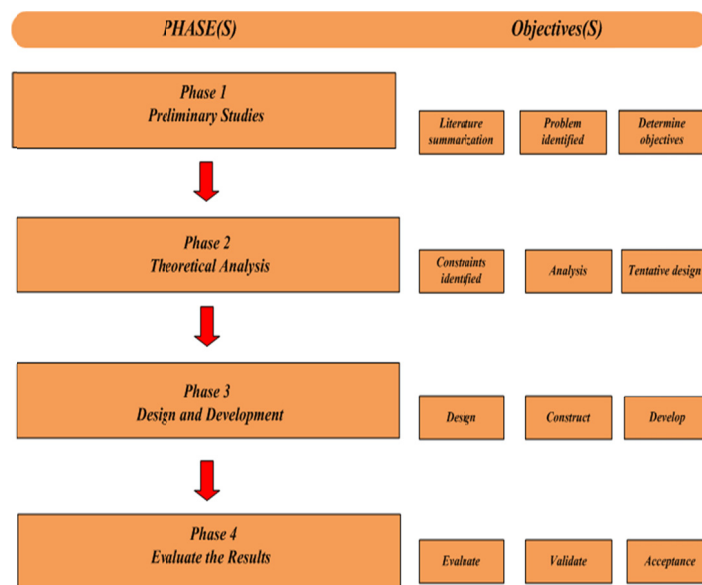


Figure 2. Proposed integrated expert user with end user in TAM model

Phase 1: Preliminary Studies

This initial phase focuses on understanding the research objectives and requirements from an environment perspective, then converting this knowledge into a problem definition and a preliminary plan designed to achieve the objectives. The output of this phase is proposal.

Phase 2: Theoretical Analysis

During this phase suggest a tentative design based on the problem definition to achieve the objectives of the study. The output of this phase is tentative design.

Phase 3: Design and Development

The Tentative Design will be implemented. The output of this phase is artifact.

Phase 4: Evaluation and Result

The evaluation was performed to determine the correctness of the system mobile tracking Model. It utilized a quantitative approach based a Technology Acceptance Model (TAM). The output of this phase is acceptance. The last phase of proposed research methodology, it is the finale of a specific study effort. The output of this phase is documentation.

## 4. Technology Acceptance Model

There are many theoretical perspectives have been developed in order to understand how end users make decisions to use technology applications. Theories provide tools to understand success or failure in implementation processes of new IT applications. The most dominant theories in IT research are Innovation Diffusion Theory (IDT) (Rogers, 1995), Theory of Planned Behavior (TPB) (Fishbein and Ajzen, 1975), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003), the FITT framework (Ammenwerth *et al*., 2002) and the Technology Acceptance Model (TAM) (Davis, 1989; Davis *et al*., 1989).

Technology Acceptance Model (TAM) (Davis 1989; Davis *et al*., 1989) is possibly the most frequently used among all other theories (Ma and Liu, 2004; Kim and Chang, 2007; Yarbrough and Smith 2007). TAM theory is based on principles adopted from Fishbein and Ajzen (1975), attitude paradigm from psychology, which specifies how to measure the behavior-relevant components of attitudes, distinguishes between beliefs and attitudes and specifies how external stimuli are causally linked to beliefs, attitudes and behavior. The theoretical model on which TAM is based is the Theory of Reasoned Action (TRA). TRA is a general model which is concerned with individuals intended behaviors. According to TRA an individual's performance is determined by the individual's attitude and subjective norms concerning the behavior in question. In addition an individual's beliefs and motivation interact with existing behavior. (Ajzen and Fishbein, 1980).

The Technology Acceptance Model (TAM) determines the user acceptance of any technology perceived usefulness (PU) and perceived ease of use (PEOU) factors. PU defines as the degree to which an individual believes that using a particular system will enhance the task performance. PEOU defines as the degree to which an individual believes that using a particular system is free of physical and mental effort (Davis, 1989; Davis *et al*., 1989; Davis, 1993). The TAM suggests that intention to accept technology is determined directly by attitude, perceived usefulness and perceived ease of use. According to TAM individuals' intention to use technology determines the actual use of the application, and attitudes toward technology affect the intention (Davis *et al*., 1989; Davis and Venkatesh, 2004).

Perceived usefulness and perceived ease factors are affected by various external variables such as level of education (Burton-Jones and Hubona 2005), gender (Venkatesh and Morris, 2000), or organizational features such as training in computer use (Venkatesh, 1999).

TAM theory is widely used in research contexts as well as with several types of technology applications (Chau and Hu, 2001; Lee *et al*., 2006; Raitoharju, 2007; Yarbrough and Smith, 2007). TAM uses for generating explanations for the factors of technology acceptance that are transferable to different user populations and different kinds of technologies.

Many different contexts and research constructions have conformed the validity of the TAM model (Ma and Liu, 2004; King and He, 2006), including in health care industry (Chau and Hu, 2002a; 2002b; Chismar and Wiley-Patton, 2002).

In this study the TAM theory will be used for the purpose of this study, to structure the research process and to help enhance the understanding of the acceptance and use of mobile reminder system. Individual factors such as

age and gender are external variables in the study. Perceived usefulness is assessed by means of the content and benefits of mobile reminder system that will help the target groups to remember what they may forget, and helping care providers to take care and save their effort and time. The functionality of the application described perceived ease of use of the system. Elderly and Alzheimer's patients can use this application by themselves easily by a simple screens designed specially to help them to remember, or can get some help from their care provider by using care provider page.

## 5. Related Literature in TAM

The standard code categorizes quality into practicality, Perceived of Perceived Ease of Use, Usefulness, Attribute of Usability and User Satisfaction. This study aims to build of these classes to research the user acceptance of the projected eight queens chess puzzle game system.

From the attitude of Technology Acceptance Model Perceived of Perceived Ease of Use, Usefulness, Attribute of Usability and User Satisfaction are assumed to be connected to the acceptance of a technology or computer system, during this study the acceptance of AN eight queens chess puzzle game system.

Technology Acceptance Model is one among the foremost fashionable theories that's used wide to elucidate data system usage such a big amount of studies are conducted that has semiconductor diode to the changes within the originally suggested model. Taylor and Todd (1995) proposed the combined TAM-TPB model which integrated the theory of planned behavior and TAM. Venkatesh and Davis (2000) suggested a new version of TAM called TAM2 which added new variables to the original TAM model. Venkatesh et al. (2003) in a study published in MIS quarterly proposed the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. There are many studies conducted by authors have attempt to modify the TAM by including new variables to the existing model. In the study by Moon and Kim (2001) are added a new variable playfulness factors to study acceptance of the World Wide Web. Chau (1996) has included two types of perceived usefulness: Long-term and near-term. Van der Heijden (2000) has analyzed the usage of the website and usage individual acceptance by adding two constructs to TAM: Perceived presentation attractiveness and Perceived entertainment value. Furthermore (Abu-Dalbouh et al., 2015) for the purpose to evaluate the institutional and academic performance in College of Sciences and Arts in Unaizah-Qassim University has modified a technology acceptance model. Chau and Hu (2001) has combined TAM with the factor of peer Influence. Sanchez-Franco and Roldan (2005) have investigate the relationship between behavioral intention and perceived usefulness and conclude that is strong among goal-directed users. Chau and Hu (2001) has compared three models Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), and a decomposed TPB model that is potentially adequate in the targeted healthcare professional setting in Hong Kong. The study indicated and conclude that TAM was superior to TPB in explaining the physicians' intention to use telemedicine technology. Shih (2004) combined the TAM and the information behavioral model that takes notice of the relevance of the information. Lee (2009) combined the Technology Acceptance Model with Theory of Planned Behavior, perceived risk and perceived benefit to understand the adoption of internet banking. TAM has been used by researchers worldwide to understand the acceptance of different types of information systems. Shafeek (2011) has used the TAM to evaluate the acceptance of e-Learning systems by teachers. Zhou et al. has proposed a new model called Online Shopping Acceptance Model (OSAM) based on TAM to investigate online shopping behavior. Pavlou (2003) has added trust and perceived risk as new variables to predict the acceptance of e-commerce. Pikkarainen et al. (2004) has developed model to understand the acceptance online banking in Finland, information in online banking and perceived usefulness play a very important role. Hsu and Chiu suggested a model that specifies that the acceptance pattern and role of internet self-efficacy plays an important role in e-service adoption. Ervasti and Helaakoski (2010) have developed a model based on TAM and TPB to understand mobile service adoption which states that perceived useful is the strongest factor in adoption. Muller-Seitz et al. (2009) used the Technology Acceptance Model with security concern to understand acceptance of Radio Frequency Identification (RFID). Abu-Dalbouh (2013) in the study designed a technology acceptance model to investigate the user acceptance of using a handheld solution in healthcare industry. Abu-Dalbouh (2016) proposed a novel evaluation model to evaluate user acceptance of software and system technology by modifying the dimensions of the Technology Acceptance Model (TAM).

## 6. Discussion

The standard software categorizes quality into functionality, Perceived of Usefulness, Perceived Ease of Use, User Satisfaction and Attribute of Usability. This paper aims to design all these categories to investigate the user acceptance of the mobile reminder system. From the perspective of TAM, perceived ease of use, perceived usefulness, user satisfaction and attribute of usability are assumed to be related to the acceptance of a computer

or technology system, in this study the acceptance of reminder mobile system.

High levels of user satisfaction are important to propose reminder mobile system. The effects of four components of satisfaction, Perceived of Usefulness Satisfaction, and Satisfaction of Perceived Ease of Use, User Satisfaction, and Satisfaction of Attribute of Usability on overall satisfaction of patients and care providers who use the application.

Perceived of Usefulness: It is defined the degree to which the target groups will remember what they may forget, By giving an opportunity to have small memory which can help them to remember tasks, events, medications and people. It also, helping care providers to save effort and time. The measurement of perceived usefulness comprises of 7 items modified to the context of this study as shown in Table 2.

Table 2. Perceived of usefulness items

| Construct | Operational definitions | Measured items |
|---|---|---|
| Perceived of Usefulness | Mobile reminder system will help the target groups to remember what they may forget, By giving an opportunity to have small memory which can help them to remember tasks, events, medications and people, It also, helping care providers to save effort and time | PU1: Proposed Mobile reminder system will help the elderly and Alzheimer's patients to remind tasks, events, medications and people<br>PU2: Proposed Mobile reminder system will help the care providers to save their effort and time.<br>PU3: Proposed Mobile reminder system and its contents such as pictures and names can help patient to remember.<br>PU4: Proposed Mobile reminder system will prevent disease progression, relieve symptoms and prevent and treat exacerbations<br>PU5: Proposed Mobile reminder system will help to reduce the cost of nursing home care.<br>PU6: Proposed Mobile reminder system will improve health status and reduce mortality<br>PU7: Proposed Mobile reminder system will enable the physicians for assessing patients |

Perceived Ease of Use: It refers to the degree to which Elderly and Alzheimer's patients can use this application by themselves easily by a simple screens designed specially to help them to remember, or can get some help from their care provider by using care provider page. The measurement of perceived ease of use construct contained 5 items and modified to the context of this study as shown in Table 3.

Table 3. Perceived Ease of Use Items

| Construct | Operational definitions | Measured items |
|---|---|---|
| Perceived Ease of Use | Elderly and Alzheimer's patients can use this application by themselves easily by a simple screens designed specially to help them to remember, or can get some help from their care provider by using care provider page | EU1: Learning to operate mobile reminder system would be easy for me<br>EU2: I would find it easy get mobile reminder system to do what I want it to do<br>EU3: My interaction with mobile reminder system would be clear and understandable<br>EU4: I would find mobile reminder system to be flexible to interact with<br>EU5: It would be easy for me to become skillful at using mobile reminder system |

User Satisfaction: It can be experienced in a variety of situations and connected to system. It is a highly personal assessment that is greatly affected by user expectations. The measurement of user satisfaction construct contained 5 items and modified to the context of this study as shown in Table 4.

Table 4. User Satisfaction Items

| Construct | Operational definitions | Measured items |
|---|---|---|
| User Satisfaction | User satisfaction refers to a level of satisfying that Elderly and Alzheimer's patients of using mobile reminder system | US1: I completely satisfied in using the mobile reminder system<br>EU2: I feel very confident in using the mobile reminder system<br>US3: I found it easy to share information about the patient condition using mobile reminder system<br>US4: I can accomplish the task quickly using this procedure<br>US5: I believe that from using mobile reminder system will increase the quality of health care industry |

Attribute of Usability: It is the area of Human-Computer Interaction (HCI) with mobile reminder system. It attempts to bridge the gap between human's goals and the system. This is being done by introducing the human issues into the design of interactive mobile reminder system, and by devising practical techniques to observe human behaviour and observe their performance. The measurement of attribute of usability construct contained 5 items and modified to the context of this study as shown in Table 5.

Table 5. Attribute of Usability Items

| Construct | Operational definitions | Measured items |
|---|---|---|
| Attribute of Usability | Attribute of usability helps to get feedback on what is or isn't working, and have a much broader understanding of what users are doing and how they interact with the system | AU1: It easy to interact with mobile reminder system by using smart phones with android system.<br>AU2: The procedure through mobile reminder system is clear<br>AU3: I found the use of mobile reminder system is suitable for each community groups.<br>AU4: I found the various functions in this system were well integrated<br>AU5: I think that I would like to use this mobile reminder system always |
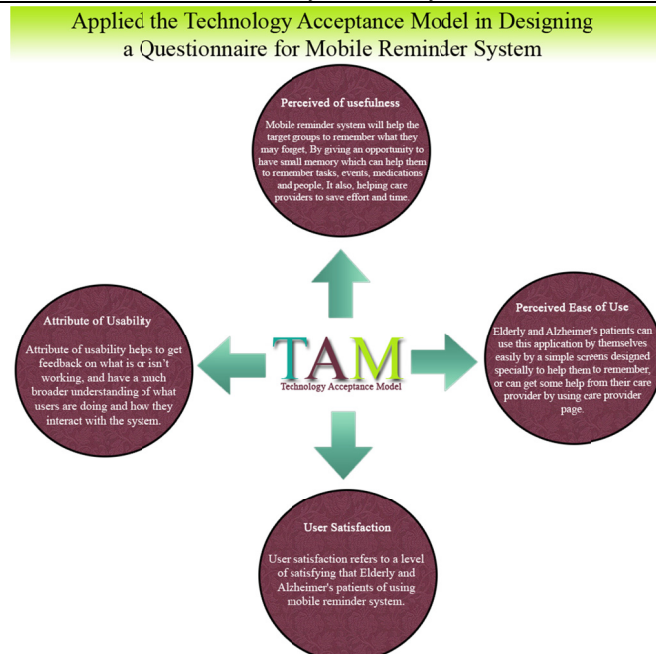


Figure 3. TAM attributes

Figure 3 summarized the related constructs for evaluation are: Perceived of Usefulness, Perceived Ease of Use, User Satisfaction and Attribute of Usability. All these constructs are modified to suit the context of the study

**7. Conclusion**

In recent years, emphasis on improving the quality of care provided by the hospitals has increased significantly and continues to gain momentum. Therefore, the demand now is creating new needs to help and make better choices as using the mobile application in health care sector. The main aim of this app is to help elderly and Alzheimer's patients, and the technology is best care because it is not susceptible to forget or to damage. Therefore, the mobile reminder system designed to includes a lot of features which helping them to remember easily and contribute to keeping their health in the long run.

We proposed methodology designed a Technology Acceptance Model (TAM) approach based on the literature studies aimed to evaluate and investigate usability test for Perceived of Usefulness, Perceived Ease of Use, User Satisfaction and Attribute of Usability as important for the user evaluation in the mobile reminder system to assess if such this pro-posed mobile system will be of much use to the intended users.

**Acknowledgments**

**References**

Abu-Dalbouh, H. M. (2016). An integrated expert user with end user in technology acceptance model for actual evaluation. *Computer and Information Science- Canadian center of science and education, 9*(1), 47-53. http://doi.org/10.5539/cis.v9n1%25p

Abu-Dalbouh, H. M. (2016). Using a Modified Technology Acceptance Model to Evaluate Designing Eight Queens Chess Puzzle Game. *J. Comput. Sci., 12*(5), 232-240. http://doi.org/10.3844/jcssp.2016.232.240

Abu-Dalbouh, H. M., Al-Roieshdie, E., Al-Otaibi, A., Al-Ma7ana, B., & Al-Mutairi, H. (2015). A proposed website to evaluate the academic performance in college of sciences and arts in unaizah. *Res. J. Applied Sci., Eng. Technol., 11*, 1305-1319. http://doi.org/10.19026/rjaset.11.2239

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://doi.org/10.3844/jcssp.2013.763.770

Ajzen, I., & Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behavior. *1st Edn., Prentice-Hall, Englewood Cliffs*, ISBN-10: 0139364439, p. 278.

Al-Omari, A. I., Jaber, K., & Al-Omari, A. (2008). Modified ratio-type estimators of the mean using extreme ranked set sampling. *J. Math. Stat., 4,* 150-155). http://doi.org/10.3844/jmssp.2008.150.155

Ammenwerth, E., Ehlers, F., Kutscha, U., Eichstädter, R., & Resch, F. (2002). Supporting patient care by using innovative information technology: A case study from clinical psychiatry. Disease Manage. *Health Outcomes, 10*, 479-487. http://doi.org/10.2165/00115677-200210080-00004

Burton-Jones, A., & Hubona, G.S. (2005). Individual differences and usage behavior: Revisiting a technology acceptance model assumption. Datab. Adv. *Inform. Syst., 36*, 58-77). http://doi.org/10.1145/1066149.1066155

Chau, P. Y. K. (1996). An empirical assessment of a modified technology acceptance model. *J. Manage. Inform. Syst., 13,* 185-204). http://doi.org/10.1080/07421222.1996.11518128

Chau, P., & Hu, P. (2001). Information technology acceptance by individual professionals: A model comparison approach. *Decision Sci., 32,* 699-719). http://doi.org/10.1111/j.1540-5915.2001.tb00978.x

Chau, P., & Hu, P. (2002b). Examining a model of information technology acceptance by individual professionals: An exploratory study. *J. Manage. Inform. Syst., 18,* 297-311). Retrieved from http://www.jstor.org/stable/40398548?seq=1#page_scan_tab_contents

Chau, P., &Hu, P. (2002a). Investigating healthcare professionals' decisions to accept telemedicine technology: An empirical test of competing theories. *Inform. Manage., 39,* 297-311). http://doi.org/10.1016/S0378-7206(01)00098-2

Chismar, W., & Wiley-Patton, S. (2002). Does the extended technology acceptance model apply to physicians? Proceedings of the 36th Hawaii International Conference on System Sciences, (CSS' 02), 160-167. Retrieved from http://dl.acm.org/citation.cfm?id=821635

Chomeya, R. (2010). Quality of psychology test between likert scale 5 and 6 points. *J. Soc. Sci., 6,* 399-403). http://doi.org/10.3844/jssp.2010.399.403

Creswell, J. W. (2011). Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research. 4th Edn., Pearson, Boston, ISBN-10: 0131367390, p. 650.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q., 13,* 319-340. http://doi.org/10.2307/249008

Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *Int. J. Man-Machine Stud., 38,* 475-487). http://doi.org/10.1006/imms.1993.1022

Davis, F. D., & Venkatesh, V. (2004). Toward preproto type user acceptance testing of new information systems: Implications for software project management. *Eng. Manage., 51,* 31-46. http://doi.org/10.1109/TEM.2003.822468

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Manage. Sci., 35,* 982-1003. http://doi.org/10.1287/mnsc.35.8.982

Ervasti, M., & Helaakoski, H. (2010). Case study of application-based mobile service acceptance and development in Finland. *Int. J. Inform. Technol. Manage., 9,* 243-259. Retrieved from http://www.inderscience.com/offer.php?id=30942

Fishbein, M., & Ajzen, I. (1975). Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. 1st Edn., Addison-Wesley Pub. Co., Reading, ISBN-10: 0201020890, pp: 578.

Hsu, M.H., & Chiu, C.M. (2004). Internet self-efficacy and electronic service acceptance, *Decision Support Systems 38:* (pp.369-381).

Jemain, A. A., Al-Omari, A., & Ibrahim, K. (2007). Multistage median ranked set sampling for estimating the population median. *J. Math. Stat., 3,* 58-64). http://doi.org/10.3844/jmssp.2007.58.64

Kanaan, R. (2009). Making sense of E-government implementation in Jordan: A qualitative investigation. PhD Thesis, De Montfort University, Leicester.

Kim, D., & Chang, H. (2007). Key functional characteristics in designing and operating health information websites for user satisfaction: An application of the extended technology acceptance model. *Int. J. Med. Inform*., 76, 790-800. http://doi.org/10.1016/j.ijmedinf.2006.09.001

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Inform. Manage.,* 43, 740-755. http://doi.org/10.1016/j.im.2006.05.003

Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. Electr. *Commerce Res. Applic., 8,* 130-141. http://doi.org/10.1016/j.elerap.2008.11.006

Lee, S., Kim, I., Rhee, S., & Trimi, S. (2006). The role of exogenous factors in technology acceptance: The case of object-oriented technology. *Inform. Manage., 43,* 469-480. http://doi.org/10.1016/j.im.2005.11.004

Ma, Q., & Liu, L. (2004). The technology acceptance model: A meta-analysis of empirical findings. *J. Organ. End User Comput., 16,* 59-72. http://doi.org/10.4018/joeuc.2004010104

Moon, J.W. & Kim, Y.G. (2001). Extending the TAM for a World-Wide-Web context. *Inform. Manage., 38,* 217-230). http://doi.org/10.1016/S0378-7206(00)00061-6

Muller-Seitz, G., Dautzenberg, K. Creusen, U., & Stromereder, C. (2009). Customer acceptance of RFID technology: Evidence from the German electronic retail sector. *J. Retail. Consumer Serv., 16,* 31-39. http://doi.org/10.1016/j.jretconser.2008.08.002

Pavlou, P.A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *Int. J. Electr. Commerce, 7,* 69-103. Retrieved from https://www.jstor.org/stable/27751067?seq=1#page_scan_tab_contents

Pikkarainen, T., Pikkarainen, K., Karijaluoto, H. & Pahnila, S. (2004). Consumer acceptance of online banking: An extension of the technology acceptance model. *Internet Res., 14,* 224-235. http://doi.org/10.1108/10662240410542652

Raitoharju, R. (2007). Information technology acceptance in the Finnish social and healthcare sector. Exploring the effects of cultural factors. Publications of the Turku School of Economics.

Rogers, E. M. (1995). Diffusion of Innovations. 1st Edn., Simon and Schuster, ISBN-10: 1451602472, p. 518.

Sanchez-Franco, M., & Roldan, J. (2005). Web acceptance and usage model: A comparison between goal-directed and experiential web users. *Internet Res., 15,* 21-48. http://doi.org/10.1108/10662240510577059

Shafeek, S. A. (2011). E-learning Technology Acceptance Model with cultural factors. MSc. Thesis, Liverpool John Moores University, School of Computing and Mathematical Sciences.

Shih, H. P. (2004). An empirical study on predicting user acceptance of e-shopping on the Web. *Inform. Manage. 41,* 351-368. http://doi.org/10.1016/S0378-7206(03)00079-X

Taylor, S., & Todd, P.A. (1995). Assessing IT usage: The role of prior experience. *MIS Q., 19*, 561-570. http://doi.org/10.2307/249633

Van der Heijden, H. (2000). Using the technology acceptance model to predict website usage: Extensions and empirical test. Serie Res. Memoranda.

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Q., 23,* 239-260. http://doi.org/10.2307/249753

Venkatesh, V., & David, F.D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Manage. Sci., 46,* 186-204. http://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Q., 24,* 115-139. http://doi.org/10.2307/3250981

Venkatesh, V., Morris, M.G., Davis, G.B.,& Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *MIS Q., 27*, 425-478. Retrieved from https://www.jstor.org/stable/30036540?seq=1#page_scan_tab_contents

Yarbrough, A.K., & Smith, T.B. (2007). Technology acceptance among physicians: A new take on TAM. Medical *Care Res. Rev., 64*, 650-672. http://doi.org/10.1177/1077558707305942

Zhou, L., Dai., L., & Zhang, D. (2007). Online Shopping Acceptance Model — A Critical Survey Of Consumer Factors In Online Shopping. *Journal of Electronic Commerce Research, 8*, 41-62.

**Copyrights**