

# FACTORS IN DESIGNING COMPUTER BASED DISTANCE TRAINING SYSTEM FOR PUBLIC SECTOR EMPLOYEES

Thamer Ahmad, Huda Ibrahim and Shafiz Affendi Mohd Yusof  
Information Technology Programme  
College of Arts and Sciences  
Universiti Utara Malaysia (UUM)

## ABSTRACT

Among the major obstacles that prevent public sector employees from attending traditional training methods are due to their commitment to family duties, distance barriers from home to training center, and conflict with working time. In today's advancement of ICT, computer-based distance training system (CBDTS) has become an alternative to solve problems of attending traditional training or face to face training. A study has been conducted in 2009 among 600 public sector employees in Jordan to identify the acceptance factors of computer based distance training system among public sector employees in Jordan. The findings show that five system characteristics have influenced in the acceptance of CBDTS. This chapter will discuss about the study with the focus on the role of the five system characteristics in influencing the acceptance of CBDTS among public sector employees, and finally, proposes guidelines in designing CBDTS based on the identified system characteristics.

## INTRODUCTION

With a development of Information and Communication Technology (ICT) many organizations all over the world are using Computer-based Distance training System (CBDTS), to train and retrain their employees. Computer Based Distance training System had been defined as the use of computer and network to convey the training materials to the remote employees (Chatzoglou et al., 2009). This method is reported to solve some of the employees' problems regarding traditional training or face to face training and provides many benefits to employees and organizations. As in the Kingdom of Jordan, the major obstacles that prevent public sector employees from attending traditional training methods are due to their commitment to family duties, distance barriers from home to training center, and conflict with working time (Mashhour, 2007; Huda et al., 2010). A study has been conducted in 2009 among 600 public sector employees in twenty-four ministries in Jordan. One of the objectives of the study is to identify the acceptance factors of computer based distance training system among public sector employees in Jordan. The findings show that five system characteristics have influences in the acceptance of computer based distance training system. These characteristics are: (i) technical usability and user ease to use (effort expectancy), (ii) performance and effectiveness of such system, (iii) enjoyment of system, (iv) system interactivity and (v) system flexibility. In this chapter, the authors will discuss the role of the five system characteristics in influencing the acceptance of CBDTS among public sector employees and will propose guidelines in designing computer-based distance training system based on the identified system characteristics.

## BACKGROUND

With the development of information system, many organizations all over the world are using e-learning system to train and retraining their employees to overcome the problems associated with traditional training method (Chatzoglou et al., 2009; Quinn et al., 2006). In this respect Pahwa et al. (2005) and Zhao et al. (2006) have indicated that there are many obstacles for employees to attend traditional training for example employees have family duties, the timing of the training coincide with working time, and irregular work. Despite these obstacles, organizations spend a lot of money to train and retrain their employees through the traditional training method, since According to Ruttenbur et al. (2000), organizations over the world have spent about 62.5 billion dollars to train their employees through traditional. In order to overcome the employees and organizations' problems with the traditional training method, the organizations have a choice by applying the computer based distance training system. According to Zhao et al. (2006) and Quinn et al. (2006), one of the benefits applying computer-based distance training system is solve the traditional training problems, in which lead to enhance the organization's productivity and improve employees' skills. However, the benefits of the computer based distance training system will not be realized if the users or the organizations fail to use or apply the system (Pituch and Lee, 2006 and Venkatesh et al. 2003). Thus, why the users or organizations reject to use the system is the problem that motivated this study.

Venkatesh et al. (2003) and Pituch and Lee (2006) have indicated that the most important key to ensure that a technology will be successful in organizations is the acceptance of such system by their employees. Additionally, they added that will provide information for those who design and purchase the information systems especially e-learning system and could suggest actions that enhance the system usage. However, according to Burgess and Russell, (2003), Chatzoglou et al. (2009), and Walczak and Scott (2009), the number of studies on the reasons why the public sector's employees reject or accept distance learning system is very limited. Additionally, many prior studies were focusing on the acceptance of e-learning system among students and in educational institution management environment (Chatzoglou et al., 2009; Dadayan & Ferro, 2005). Furthermore, no studies on the e-learning system that investigate the system characteristics that could be drive the users to use such system (Pituch and Lee, 2006). It is also a challenge to find information from previous studies on acceptance of computer-based distance training system among public employees in Jordan. However, the prior studies found that the distance learning system is as effective as the traditional teaching methods for deliver the teaching materials to the remote students (Choi et al., 2007). Therefore, this study is going to examine the effect of critical distance training system's characteristics on the acceptance of such system among public sector's employees in Jordan.

### **Information System Acceptance Models**

The literature of information system provides many models and theories that used to investigate the influence of system characteristics and other factors such as user's characteristics and implementation environment characteristics on the user's intention to use a computer system or on usage of a computer system itself. The most common such models and theories are Theory of Reasoned Action (TRA) by Fishbein and Ajzen in 1975, Technology Acceptance Model (TAM) by Davis in 1989, Extended TAM (TAM2) by Venkatesh and Davis in 2000, Motivational Model (MM) by Davis and other in 1992, Theory of Planned Behavior (TPB) by Ajzen in 1991, Social Cognitive Theory (SCT) by Compeau and Higgins in 1995, Model of PC utilization by Thompson an other in 1991, Combined TAM and TPB by Taylor and Todd in 1995, Diffusion of Innovation Theory (DOI) by Moore and Benbasat in 1991 and Unified Theory of Acceptance and use Technology by Venkatsh and other in 2003.

Although a lot of studies such as Saade et al. (2007), Masrom (2007) and Halawi and McCarthy (2008) indicated that TAM could strongly explain the relationships between an information system's characteristics and such system usage in general and the relations between distance learning system and its usage in specific, it assumes that all the computer system characteristics have influenced the system usage and user's intention to use a system through the easy of use and usefulness. In the other hand, according to Davis et al. (1992), Hsia and Tseng (2008) and Chatzoglou et al., 2009 some computer system characteristics for instance system enjoyment and system flexibility have direct effect on a user's intention to use an information system.

Although, the unified theory of acceptance and use technology (UTAUT) does not also cover all the critical computer system characteristics such as system flexibility, system enjoyment and system interactivity (Chatzoglou et al., 2009; Hsia and Tseng, 2008 and Nanayakkara, 2005), but it was formulated by assessing the similarities and the differences across all previous common acceptance models and theories. Additionally, UTAUT could successfully predict the users' intention to use an information system or a system usage in approximately 70% (Venkatesh et al., 2003). In the other words, it could explain the relationships of the information system characteristics and other factors with a user's intention to use an information system in such percentage, but other acceptance model and theories could successfully predict the user's intention to use an information system or an information system usage in approximately 40% (Davis, 1989). Furthermore, among the advantages of UTAUT, it is suitable to investigate the acceptance of an information system among the big organizations' employees (Venkatesh et al., 2003 and Marchewka et al., 2007). Therefore, in this study, the UTAUT has been extended to examine the effect of the computer based distance training system's characteristics including system usefulness (performance expectancy), system easy of use (effort expectancy), system flexibility, system interactivity and system enjoyment and some other factors on the acceptance of such system. It is worth to mention that UTAUT involves four constructs including performance expectancy and effort expectancy which related to the system characteristics, social influence and facilitating conditions which related to the implementation environment characteristics. [Figure 1](#) shows UTAUT's constructs.

(i) Performance expectancy refers to a person's belief that using a particular system will enhance his/her work performance (Payne & Curtis, 2008). Venkatesh et al. (2003) derived performance expectancy from five constructs from prior information technology acceptance models, as follows: (a) outcomes expectations in SCT, (b) perceived usefulness in TAM, (c) relative advantage in DOI, (d) extrinsic motivation in MM, and (e) job fit in MPCU (Huang et al., 2007; Venkatesh et al., 2003). According to Venkatesh et al. (2003), performance expectancy is a strong predictor of behavioral intention in both voluntary and mandatory settings in information system context. Furthermore, they added that the relation between performance expectancy and behavior intention may be moderated by age and gender.

(ii) Effort expectancy is about a person perceiving that a particular system will be easy to use. Similar to performance expectancy, this construct is derived from three constructs, taken from other existing models (Payne & Curtis, 2008). The constructs are (a) complexity in DOI, (b) complexity in MPCU, and (c) ease of use in TAM (Huang et al., 2007; Venkatesh et al., 2003). Venkatesh et al. 2003 indicated that effort expectancy has a significant influence on behavioral intention of a user to use information system. They added that the relationship between behavioral intention and effort expectancy may be moderated by gender, experience and age (Venkatesh & Davis, 2000; Venkatesh et al., 2003).

(iii) Social influence refers to a user's perception of the opinion of other people of whether or not he/she performs a behavior (Payne & Curtis, 2008). This construct pertains to (a) subjective norms in TAM2 and TRA, (b) social factors in MPCU, and (c) image in DOI. According to Venkatesh et al. (2003), social influence and behavioral intention relation is moderated by three factors, i.e. age, gender, and experience (Huang et al., 2007; Venkatesh et al., 2003).

(iv) Facilitating conditions refers to a person's perception that the organization and technical infrastructure will help him/her to use the system (Payne & Curtis, 2008). This construct is also captured from three constructs in other models: (a) perceived behavior control in TPB, (b) facilitating conditions in MPCU, and (c) compatibility in DOI (Huang et al., 2007; Venkatesh et al., 2003). Venkatesh et al. (2003) indicated that the facilitating conditions construct is a good predictor of use of information system. However, the relation between facilitating conditions and use behavior is moderated by two variables including age and experience. As such, the system will affect older users who have a lot of experience (Venkatesh et al., 2003). Table 1 shows the UTAUT constructs and their extensions.

Table 1: UTAUT Constructs from Other Combination Models

UTAUT constructs	Combination from other models	
Performance expectancy	Perceived usefulness	TAM
	Relative advantage	DOI
	Extrinsic motivation	MM
	Job fit	MPCU
Effort expectancy	Outcomes expectations	SCT
	Complexity	DOI
	Complexity	MPCU
	Ease of use	TAM
Social influence	Subjective norms	TAM2 and TRA
	Social factors	MPCU
	Image	DOI
Facilitating conditions	Perceived Behavior Control	TPB
	Facilitating conditions	MPCU
	Compatibility	DOI

Unified theory acceptance and use technology (UTAUT) has been applied as a framework in many areas. Marchewka et al. (2007) adopted UTAUT to test students' acceptance of blackboard technology. They found that UTAUT is not a strong predictor of this technology. Dadayan and Ferro (2005) used some constructs of UTAUT to examine the acceptance of technology in the public and private sectors. Anderson and Schwager (2004) also applied UTAUT to examine the acceptance of wireless network by employees in business organizations.

Dadayan and Ferro (2005), and Nanayakkara (2005) listed the following weaknesses of UTAUT models. They argued that the model does not consider the individual factor. In the literature of

information system and user's acceptance models, many constructs have been used to measure the individual factor. They are anxiety, self-efficacy and user attitude. Unified theory acceptance and use technology (UTAUT) model does not include these constructs.

However, Venkatesh et al. (2003) indicated that these constructs have indirect significant influence on user's intention to use information and communication technology. Additionally, the initial empirical study and e-learning literature indicated that there are many sub critical factors that influence the employees' intention, relate to the system characteristic factors including system flexibility, system interactivity and system enjoyment, which are not covered by the UTAUT. Furthermore, according to Sumak et al. (2010) and Jong and Wang (2009) the validity of UTAUT needs to be further tested in the e-learning context.

### Issues of Traditional Training in Jordan

Public sector's employees in Jordan are demanded to sit for one certified IT training, known as International Computer Driving License (ICDL). This training has been implemented in Jordan as a standard for end user computer skills across the kingdom since 2001. Most of the Jordanian ministries, for instance the Ministry of Education, Ministry of Health, Ministry of High Education, ministry of water and irrigation and Ministry of Information and Communication Technology (ICT), have adopted this program for their employees since 2003 (Advance Learning, 2008). Approximately 70,000 employees of the Ministry of Education must participate in this program (ICDL foundation, 2007). However, according to an initial study, due to the inappropriateness training time that is continuously unfit with the employees' schedule, the Ministries faced difficulties to conclude the computer skills training (ICDL) for its employees. To employees, this challenge has prevented them from attending the program training and sitting to the certificate exam, which could affect their career. As in the Kingdom of Jordan, the major obstacles that prevent public sector employees from attending traditional training methods are due to their commitment to family duties, distance barriers from home to training center, and conflict with working time.

According to Hsia and Tseng (2008), and Quinn et al. (2006), the best and successful way to solve the problems of attending traditional training is by applying a distance training system, which is defined by Chatzoglou et al. (2009) as a computer-based distance training that uses computer and network to convey the training materials and training resources to remote employees. This is not to say that distance training system can totally replace traditional systems, but the implementation of distance training system, to a certain extent, is able to support or complement the traditional method. In the literatures, e-learning has been widely used instead of distance learning. Additionally, computer-based training system (CBTS), web based training system (WBTS), Internet based training (IBT), and other acronyms are also synonymous for e-learning. These alternatives give an opportunity for the employees to attend training without physically be come to the training location.

As the problems of attending a certified IT training; ICDL, has occurred among public sector employees in Jordan, this study therefore, is going to investigate the acceptance of computer-based distance training system as an alternative training approach to overcome the employees' problem with the traditional training method and to make the organizations obtain the advantages of the way.

### Critical System's Characteristics

The review on the information system literature in general and on the distance learning in specific, offers many evidences that reveal, there are many computer based distance learning system's characteristics that could derive the system's users to accept and use such system including system flexibility, system

enjoyment, system interactivity, easy of use (effort expectancy) and system usefulness (performance expectancy), which have been explained in some details in this section.

Effort expectancy (EE) is about a person perceiving that a particular system will be easy to use. Based on the previous studies, EE is actually one of the UTAUT constructs. As previously mentioned, it derived from three constructs; (a) complexity in Diffusion of Innovation Theory (DOI), (b) complexity in Model of PC Utilization, and (c) ease of use in Technology of Acceptance Model (TAM (Huang et al., 2007 and Venkatesh et al., 2003). Davis (1989), Venkatesh et al. (2003) and Sumak et al (2010) have indicated that effort expectancy has a significant influence on behavioral intention of a user to use information system. Adapting such construct to this study reveals that, public-sector employees will use the computer based distance training system if they believe that the system is easier to use.

According to Payne & Curtis (2008), performance expectancy refers to a person's belief that using a particular system will enhance his/her work performance. Venkatesh et al. (2003) also derived performance expectancy from five constructs from prior information system acceptance models, as follows: (a) outcomes expectations in SCT, (b) perceived usefulness in TAM, (c) relative advantage in DOI, (d) extrinsic motivation in MM, and (e) job fit in MPCU (Huang et al., 2007; Venkatesh et al., 2003). This constructs has also significant effect on the acceptance of the information systems (Davis, 1989; Jong and Wang, 2009; Huang et al., 2007 and Venkatesh et al., 2003). Adapting performance expectancy to this study supposes that public sector employees will accept the computer based distance training system if they perceived that the system will enhance their training performance.

System Enjoyment refers to the extent to which the activity of using a computer system is perceived to be personally enjoyable in its own right aside from the instrumental value of the technology (Davis et al., 1992). Enjoyment is an aspect of intrinsic motivation, and according to Davis et al. (1992), Abbad et al. (2009) and Chatzoglou et al. (2009) it has significant effect on the acceptance of information system. Adapting system enjoyment to this study reveals that, the public sector employees will use the system if they believe that the enjoyment of using computer based training system, with multimedia and interactive features will overcome their obstacles with the traditional training methods. More information provided through such system will highly drive employees towards accepting the system.

System interactivity relate to the interactions between instructors and learners, learners themselves, and learners with organization as key elements of learning process (Abbad et al., 2009). Development of technologies used in the e-learning context increases the ability of individuals to interact anywhere at any time using many tools such as videoconference, e-mail, chat room, forums, etc. this system characteristics (system interactivity) has significant effect on the acceptance of computer information system by the users (Davis, 1989 and Abbad et al., 2009). In this study, system interactivity refers to the public-sector employees in Jordan believe that computer-based distance training system can provide interactive communication between members of organizations and trainees and between trainees themselves.

System Flexibility means that students or trainees can access any learning materials from any place at any time (Burgess, and Russell, 2003). Distance learning system offers opportunity to students and trainees to access the learning materials by any device connected to the Internet. It also enables trainees who stay in the remote regions to access the center of training, and this training method is suitable for trainees who have irregular work or personal schedule. According to Hsia and Tseng (2008) system flexibility has impact on the acceptance of an information system. Adapting this characteristic to this study suppose

that, the public sector's employees will use the computer based distance training system if they perceived that the flexibility of the system will overcome their obstacles with the traditional training methods.

As previously mentioned the UTAUT has been **modified** in this study, In order to investigate the effect of the previous system's characteristics on the acceptance of computer based distance training system among the public sector's employees in Jordan. Thus, five hypotheses have been formulated as the following:

H1: there is significant relationship between the performance expectancy and acceptance of computer based distance training system.

H2: there is significant relationship between effort expectancy and acceptance of computer based distance training system.

H3: there is significant relationship between system flexibility and acceptance of computer based distance training system.

H4: there is significant relationship between system enjoyment and the acceptance of computer based distance training system.

H5: there is significant relationship between system interactivity and the acceptance of computer based distance training system.

Although the rest of UTAUT's constructs including social influence and facilitating conditions, are not related to the system characteristics, the effect of them on the acceptance of computer based training system has been examined.

**Figure 2** shows the proposed model of the acceptance of computer-based distance training system among the public sector employees in Jordan.

## Factors in Designing CBDTS

A study has been conducted in 2009 among 600 employees in twenty-four ministries in the Kingdom of Jordan. The main purpose of the study is to identify the acceptance factors of computer based distance training system among public sector employees in Jordan. In data collection process, questionnaires were distributed based on a convenience sampling method. From the total of 600 employees, 351 had returned the questionnaire with a response rate of 58.5%. The percentage is not very high since there was a challenge in getting permission from some ministries to get contact to their employees for the data collection purpose. The findings show that five system characteristics have influences in the acceptance of computer based distance training system. These characteristics are: (i) effort expectancy, (ii) performance expectancy, (iii) system enjoyment, (iv) system interactivity and (v) system flexibility. This approach can provide a platform to easily attend ICDL or any other training at anytime and anywhere, without leaving homes or families, which is among the main reasons they could not afford attending traditional training. To support the realization of this alternative mode of training, the support of good and reliable IT infrastructure, either at home or offices, is very critical to give accessibility of such system to employees. The following is the description of the five characteristics in relation to this study.

### System flexibility

As previously mentioned in the last section system flexibility refers to a user perceive that he/she can access the computer based distance training system from any place at any time. The study found that not only this characteristic has influenced the public sector employees' intention to use the computer based distance training system, but also has an effect on the performance expectancy, in which consistent with findings of Hsia and Tseng (2008). In this respect, the public sector's employees have perceived that system flexibility will overcome their troubles with the traditional training methods and improve their training. Thus, the organizations that have plan to apply the computer based distance training system for their employees training should take into their consideration that the system must be accessible from any

device connected on the Internet or use other ways to convey the training materials to the remote employees.

Such organizations have two ways to apply the computer based distance training system to train their employees. It can use the technologies of synchronous computer based distance training system which provides a way to send the training materials immediately from the trainers or organizations' resources to the remote trainees. For this reason, the trainees and trainers must be online to make the training processes carried out. Therefore, one of this way disadvantages is it does not provide flexibility with time, since the trainees can only determine the place of training process.

Interestingly, there are many examples on the synchronous computer based distance training system including, using online lectures to conduct the training programs or using videoconferences technology to convey the training materials to the remote trainees. Additionally, videoconferences technology allows the trainers to receive the trainees' feedback immediately. The second kind of the computer based distance training system is asynchronous computer based distance training system. In this kind the trainees can access the training materials from any where at any time, since this kind of computer based distance training system provides training environment in which the trainees and trainers geographically separated and trainees access the training materials at any time any place (Wag et al., 2005). An example on the asynchronous computer based distance training system is applying web based training system to offers the training materials to the remote trainees or CD / DVD could be used to offer the training materials (Behling et al., 2007).

#### System interactivity

System interactivity is related to the system ability to allow the trainees to interact with the trainers, other trainees, experts or/ and organizations' members (Abbad et al., 2009). Many evidences in the literature (Abbad et al., 2009 and Davis, 1989) reveal that system interactivity has indirect effect on acceptance of an information system in general and on the acceptance of a distance learning system in specific through performance expectancy (usefulness) and effort expectancy (easy of use). Similarly, this study found that system interactivity has significant effect on the acceptance of computer based distance training system through performance expectancy and effort expectancy. Thus, in the distance training system, system interactivity can be proposed allowing trainees to send and receive messages immediately using interactivity tools such as videoconferences, e-mail, chat room, forums, etc (Castro, 1998; Campbell et al., 2007). By doing so, trainees will be able to discuss any obstacle faced while using the system or with the training materials. Additionally, system interactivity will provide the trainees an opportunity to share their knowledge with others trainees, trainers or/ and experts.

#### System enjoyment

As mentioned in the section of critical system' characteristics, system enjoyment is related to the believing that computer based distance training system will be enjoyable, regardless its effect on the training performance (Conci et al., 2009). Similar to the other studies (Davis et al., 1992, Abbad et al., 2009 and Chatzoglou et al., 2009) which revealed that system enjoyment has significant effect on the acceptance of information system acceptance, on the system usability (easy of use) and system usefulness, this study also found that system enjoyment has significant effect on the acceptance of computer based distance training system, usability of it and its performance. These findings have revealed that system enjoyment not only motivates the employees to use the computer based distance training system, but also this characteristic improves the system usability and its performance. In implementing the system enjoyment in the computer based distance training system, system developers should assure that the graphical user interface of the system is designed in the enjoyable way. Additionally, the training materials are provided in many formats including video, audio and text, since the multimedia technology makes the system enjoyable and useful (Castro et al., 2001 and Liu & Wah, 2007).



### Performance expectancy

Performance expectancy or it could be called usefulness, it refers to the degree to which the employees believe that the computer based distance training system will improve their training (Venkatesh et al., 2003). This study found that the performance expectancy has significant impact on the computer based distance training system acceptance. This finding lends support to the findings of Davis (1989), Venkatesh et al. (2003) and Sumak et al (2010). It can be perceived from such finding that, the employees will use the system if they have perceived that the system will improve their training. This study also found that the performance expectancy is affected by many factors including: (i) effort expectancy, which means if the system is easier during use, it will enhance the employees training and lead them to understand the training materials well, (ii) system enjoyment, if the employees feel fun while they use the system and while they use training materials that will enhance their training, (iii) system flexibility, as previously mentioned system flexibility enables the employees to choose their training time and place in which positively effect their training performance, (iv) system interactivity, interactivity feature provides opportunity to the trainees to interact with other trainees, trainers and experts to discuss the problem which faced them during the training process that will help to improve their training performance.

### Effort expectancy

Effort expectancy or it could be called easy of use, is related to the degree to which the employees believe that the computer based distance training system is easier to use (Venkatesh et al., 2003). There is evidence in the literature (Davis, 1989; Jong and Wang, 2009; Huang et al., 2007 and Venkatesh et al., 2003) that effort expectancy has significant effect on the acceptance of an information system in general and on the distance learning system in specific. In consistent with these findings this study found that effort expectancy has significant impact on the acceptance of computer based distance training system. It can be said, the employees intend to use the system if it does not need much effort during the use. The study also found that effort expectancy has been affected by two factors including system interactivity, which means the interaction between the trainees themselves, with trainers and with the experts makes the system easier to use. The second factor which found to be has impact on the effort expectancy is system enjoyment. In this respect the materials enjoyment and system fun drive the employees to perceive that the system is easier to use. Additionally, there are many factors that should be taken into consideration during design the system, in order to make it easier to use such these factors are help, fatigue, concentration, adaptability and errors. **Figure 3 presents the designing of CBDTS model**

## FUTURE RESEARCH DIRECTIONS

The results of this study which obtained from the public sector's employees perspective toward the characteristics of computer based distance training system, have provided opportunities for the further research. A further research can explore with a focus to formulate a new model to examine the impact of the characteristics of computer based distance learning system as a computer based information system on the acceptance of such system. additionally, this study concerns on only five system characteristics including system flexibility, system enjoyment, system interactivity, easy to use and system usefulness. in further, more research can be conducted to explore more on the possibilities of presenting new significant relationships between other system characteristics and system easy of use, system usefulness and the acceptance of information system in general or computer based distance training system in specific. Among other system characteristics could include (i) help which means the computer based distance training system should provide help when the user face problems during the system usage, (ii) concentration: computer based distance training system should reduce the number of things that the user

need keeping it in his/ her memory while he/ she use the system. Whereas, labeling the system's screens and its output is a good way to reduce the memory load, (iii) error: computer based distance training system should minimize the number and serious of errors that could be made during the system usage, (iv) fatigue: computer based distance training system should make the user comfortable (minimize the tiring) during the system usage by provide the information in a sequence way and by overcome the concentration, (v) uniformity: the graphical user interface of computer based distance training system should be designed as same as the graphical user interface of the other common system which the users are familiar with it.

Additionally, this study provides an opportunity to the further researches to develop architecture to design the computer based distance training system with such critical successful characteristics. Furthermore, According to, Rezaei et al. (2008); Jong and Wang (2009) and Friedrich and Hron (2010) there are many sub critical success factors related to the individual factor, are computer self-efficacy and computer anxiety. Even though these factors have used in information systems and in distance learning system acceptance but, these factors have not been tested using UTAUT. Thus, this is opportunity for the further research to extend the UTAUT to cover such sub factors and examine the impact of such factors on the acceptance of computer based distance training system.

## Summary

This chapter shows that the number of studies which have been conducted to examine the acceptance of computer based information system, especially the computer based distance learning system and on the effect of the system's characteristics on the acceptance of such system, is very limited. Furthermore, it presents that the review on the information system and distance learning system literature reveals that five system characteristics namely system flexibility, system enjoyment, system interactivity, easy of use and usefulness that found to have effect on the acceptance of an information system or computer based distance learning system by the organizations employees and educational institutions' students. Interestingly, in this study (i) system flexibility refers to the degree to which the public sector employees believe that they can access the computer based distance training system from any device connected on the Internet at any time, (ii) system enjoyment is related to the degree to which the employees perceive that computer based distance training system will be enjoyable, while they use the system, (iii) system interactivity which about the employees will use the system if they believe that the system will enable them to interact together, whit trainers and with the experts, (iv) system easy to use: it about the degree to which the public sector employees will believe that the system will be easier to use, and (v) system usefulness which is related to the degree to which the employees perceive that the computer based distance training system will improve their training.

Additionally, it can be seen that, there is no model has covered all the factors especially the system characteristics factors which have affected the acceptance of the computer based distance learning system. Therefore, many advantages drive to extend the UTAUT to cover the system characteristics that could affect the acceptance of computer based distance learning system. These advantages include: UTAUT was adapted from all common previous information system acceptance models and theories; could successfully predict the acceptance in approximately 70% of the cases and suitable to investigate the acceptance of information system by the employees of organizations.

The data which had been collected from the public sector employees in Jordan and the structural equation model (SEM) were used to examine the effect of the system characteristics factors and other factors including social influence and facilitating conditions on the acceptance of computer based distance

training system. Consequently, the results of this study have revealed that the system flexibility, system enjoyment, system interactive, easy of use and usefulness have affected the acceptance of computer based distance training system among public sector's employees in Jordan. Thus, the computer based distance training system development team should make sure that all the previous characteristics embedded in the system, while it has been developed, in order to ensure that applying the system for the employees training will be successful.

## REFERENCES

- Abbad, M. M., Morris, D., & Nahlik, C. (2009). Looking under the bonnet: Factors affecting student adoption of e-learning systems in Jordan. *International Review of Research in Open and Distance Learning*, 10(2), 1492-383.
- Advancelearning (2008). ICDL in the Middle East. Retrieved May 20, 2009, from: [eu.advancelearning.com/solutions/icdl/middle-east/](http://eu.advancelearning.com/solutions/icdl/middle-east/)
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human Decision Processes*. 50(2), 179-211.
- Ajzen, I., & Fishbein, M. A. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley: Addison-Wesley publishing.
- Anderson, J. E., & Schwager, P. H. (2004). SME adoption of wireless LAN technology: Applying the UTAUT model. *Proceedings of the 7th Annual Conference of the Southern Association for Information Systems*.
- Behling, K., Orczyk, J., & Jenkins, J. (2007). Live distance learning delivery of Master of Science courses in building construction management. *37th ASEE/IEEE Frontiers in Education Conference*.
- Burgess, J. R. D., & Russell, J.E.A. (2003). The effectiveness of distance learning initiatives in organizations. *Journal of Vocational Behavior*, 63(2), 289-303.
- Campbell, R., Eisenbarth, S., Skurla, C. (2007). Electronic content development for engineering distance learning. *37th ASEE/IEEE Frontiers in Education Conference*, 18-22.
- Castro, M. (1998). Technology innovation and integration in distance education. *Electro technical Conference*, 1, 164-168.
- Castro, M., Clara, M., & John, S. (2001). Examples of distance learning projects in the european community. *IEEE Transactions on Education*, 44(4), 406 - 411.
- Chatzoglou, P. D., Sarigiannidis, L., Vraimaki, E., & Diamantidis, E. (2009). Investigating Greek employees' intention to use web-based training. *Computers & Education*, 53(3), 877 - 889.

- Choi, D. H., Kim, J., & Kim, H. S. (2007). ERP training with a web-based electronic learning system the flow theory perspective. *Int. J. Human-Computer Studies*, 65, 223 – 243.
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189-211.
- Conci, M., Pianesi, F., & Zancanaro, M. (2009). Useful, social and enjoyable: Mobile phone adoption by older people. *12th IFIP TC13 Conference on Human-Computer Interaction*, 63-76.
- Dadayan, L., & Ferro, E. (2005). When technology meets the mind: A comparative study of the technology acceptance model. *International conference on electronic government*, 35 (91), 137-144.
- Davis F., Bagozzi R., & Warshaw P. (1992). Extrinsic and intrinsic motivation to use computer in the workplace. *Journal of Applied Social Psychology*, 22(14), 1111-1132.
- Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance. *MIS Quarterly*, 13(3), 319-340.
- Friedrich, H.F., & Hron, A. (2010). Factors influencing pupils' acceptance of an e-learning system for secondary schools. *Journal of Educational Computing Research*, 42, 63-78.
- Halawi, L., & McCarthy, R. (2008). Measuring students perceptions of blackboard using the technology acceptance model: A PLS approach. *Issues in Information Systems*, 9(2), 95-102.
- Hsia, J. W., & Tseng, A. H. (2008). An enhanced technology acceptance model for e-learning systems in high-tech companies in Taiwan: Analyzed by structural equation modeling. *International Conference on Cyberworlds 2008*, 39-44.
- Huang, Y. H, Wag, Y. S., & Chou, S.C. (2007). User acceptance of e-government services. *11th Pacific-Asia Conference on Information Systems*, 97.
- ICDL US (2009). *ICDL foundation*. Retrieved on March, 20, 2009, from: <http://www.icdlus.com>.
- Jong, D., & Wang, T.S. (2009). Student acceptance of Web based learning system. *2009 International Symposium on Web information system and application (WISA '09)*, 533-536.
- Liu, Y., & Wah, Y. H. (2007). Human-centered multimedia e-learning system for real-time interactive distance education. *Multimedia and Expo, 2007 IEEE International Conference on*, 2042 – 2045
- Marchewka, J., Liu, C., & Kostiwa, K. (2007). An application of the UTAUT model for understanding student perceptions using course management software. *Communications of the IIMA*, 7(2), 93-104.

- Mashhour, A. S. (2007). A distance education model for Jordanian students based on an empirical study. *Turkish Online Journal of Distance Education-TOJDE*, 8(2), 1302–6488.
- Masrom, M. (2007). Technology acceptance model and e-learning. *International Conference on Education, Sultan Hassanah Bolkiah Institute of Education Universiti Brunei Darussalam 21-24 May 2007*. Malaysia.
- Moore, G. C., & Benbasat, I. (1996). Integrating diffusion of innovations and theory of reasoned action models to predict utilization of information technology by end-users. In K. Kautz, & J. Pries-Heje. *Diffusion and Adoption of Information Technology* (pp. 132-146). London: Chapman and Hall Publishers.
- Nanayakkara, C. (2005). A model of user acceptance of learning management systems: a study within tertiary institutions in New Zealand. *International Journal of Learning*, 13(12), 223-232.
- Pahwa, A., Gruenbacher, D., Starrett, S., & Morcos, M. (2005). Distance learning for power professional. *IEEE Power and Energy Magazine*, 3(1), 53-58.
- Payne, E.A., & Curtis, M. B. (2008). Can the unified theory of acceptance and use of technology help us? Retrieved on June 14, 2009, from: <http://aaahq.org/meetings/AUD2009/CanTheUnifiedTheory.pdf>
- Pituch, K. A., & Lee, Y. K. (2006). The Influence of System Characteristics on E-learning Use. *Computer & Education*, 47, 222 – 244.
- Quinn, B., Barroca, L., Nuseibeh, B., Fernández, J., Rapanotti, L., Thomas, P., & Wermelinger, M. (2006). Learning software engineering at a distance. *IEEE Computer Society*, 23(6), 36-43.
- Rezaei, M., Movahed, H. M., Asadi, A., & Kalantary, K. (2008). Predicting e-learning application in agricultural higher education using technology acceptance model. *Turkish Online Journal of Distance Education*, 98(1), 85-95.
- Ruttenbur, B. W., Spickler, G. C., & Lurie, S. (2000). *E-learning the engine of the knowledge economy*. Retrieved on July, 20, 2009, from: <http://www.fondazionecri.it/elearning/data/allegati/links/1193/2000%20Morgan%20Keegan.pdf>
- Saade, R. G., Nebebe, F., & Tan, W. (2007). Viability of the technology acceptance model in multimedia learning environments: A comparative study. *Interdisciplinary Journal of Knowledge and Learning Objects*, 3(2), 175-184.
- Sumak, B., Hericko, M., Polancic, G., & Pusnik, M. (2010). Investigation of e-learning system acceptance using UTAUT. *International Journal of Engineering Education* 26(6), 1327-1342.

- Taylor, S., & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176.
- Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal computing: Toward a conceptual model of utilization. *MIS Quarterly*, 15, 124-143.
- Venkatesh, V., & Davis, F. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management and Science*, 46(2), 186-204.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F., D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Wag, H., Lin, Chang, W., & Shih, T. (2005). Applying Petri Nets to model learning sequence with SCORM specification in collaborative learning. *Proceedings of the 2005 International Conference*, pp.181- 186.Taiwan
- Walczak, S., & Scott, J.E. (2009). Cognitive engagement with a multimedia ERP training tool: Assessing computer self-efficacy and technology acceptance. *Information and Management*, 46, 221-232.
- Zhao, X., Zhong, Y., & Matsumoto, M. (2006). A real-time interactive shared system for distance learning. *Multi Media Modelling Conference Proceedings*, pp.6.

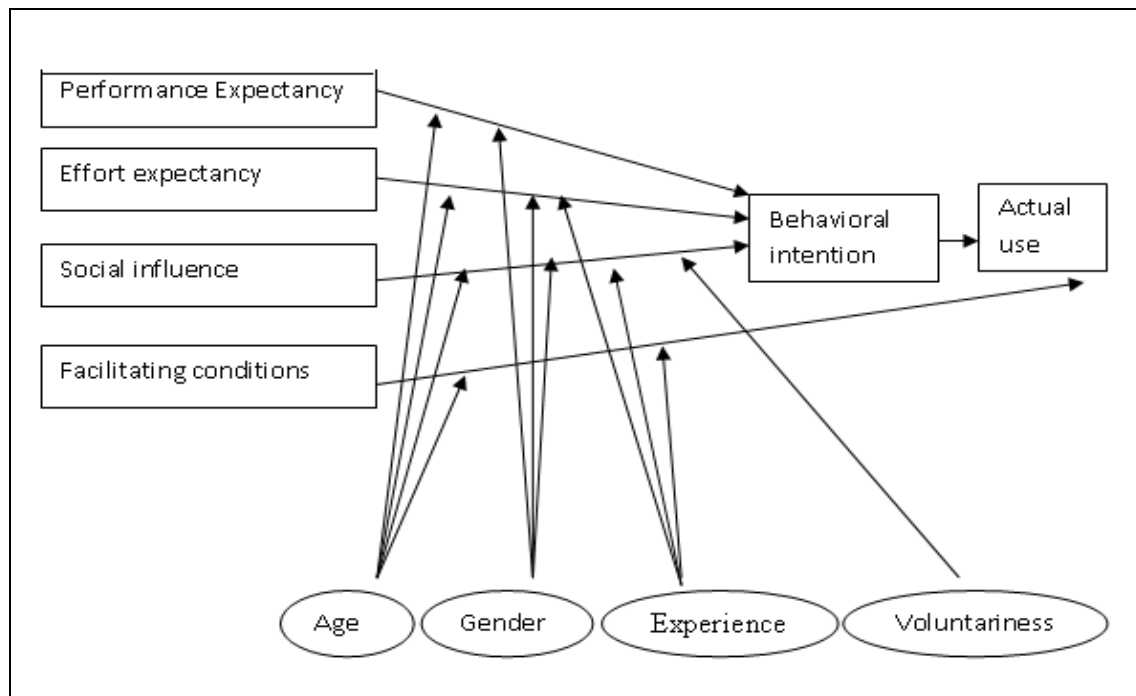


Figure 1: Unified Theory Acceptance and Use Technology

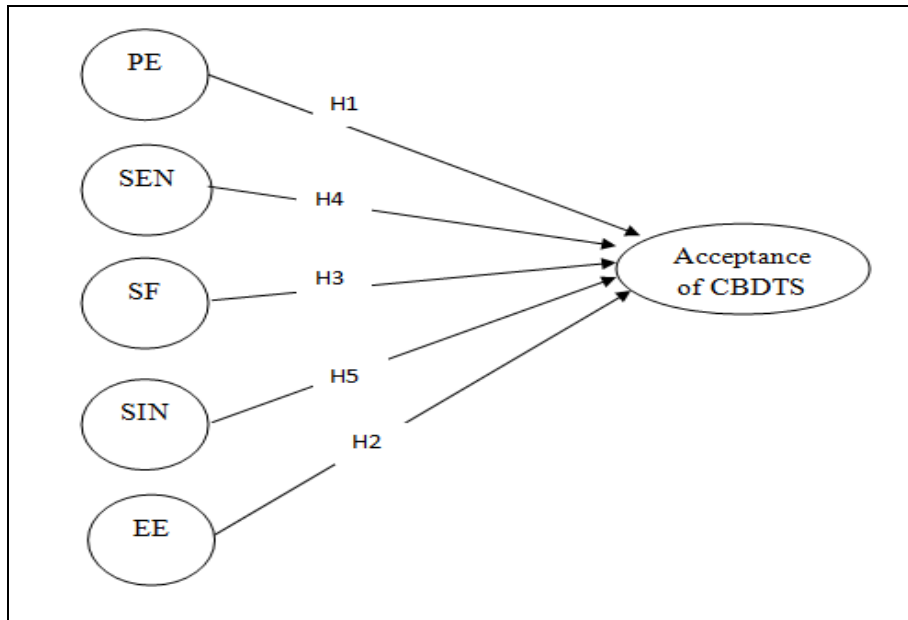


Figure 2: the Proposed Model of Acceptance of CBDTS Among Public Sector's Employees

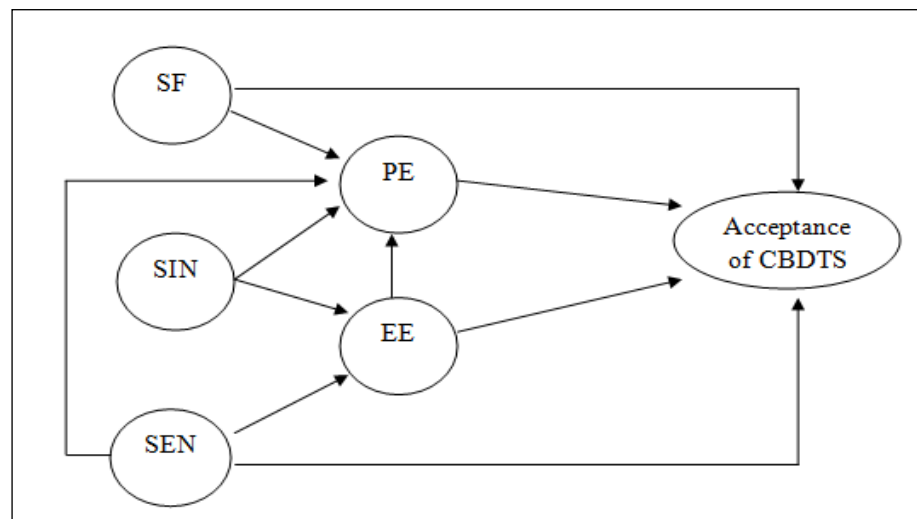


Figure 3: Designing of CBDTS Model