

Extended UTAUT to Examine the Acceptance of Web Based Training Systems by Public Sector Employees.

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Abstract—With the development of information technology, organizations have applied e-learning system to train their employees in order to enhance their performance. In this respect, applying the web-based training system will enable organizations to train their employees quickly and effectively anywhere at any time. Using some factors such as flexibility of web-based training systems, system interactivity, system enjoyment and some moderators including age, gender and experience, this paper aims to extend the Unified Theory of Acceptance and Use of Technology (UTAUT), as a way to explain the employees' intention to use web-based training system. A total of 290 employees participated in this study. The findings of the study revealed that performance expectancy, facilitating conditions, social influence and system flexibility have direct effect on the employees' intention to use the web-based training system, while effort expectancy, system enjoyment and system interactivity have indirect effect on employees' intention to use the system.

Index Terms—acceptance of e-learning systems, UTAUT, acceptance of web-based training systems, requirements of web-based training system's software and requirements of e-learning system's software

I. INTRODUCTION

In organizations, applying Information and Communication Technology (ICT) has played an indispensable role in reducing the cost and improving the performance of the whole organization. With these and other capabilities such as flexibility of e-learning system, the usage of e-learning systems has significantly increased [16],[7].

Nowadays, with the development of the internet and multimedia technology, web-based training systems provide many benefits to individuals and organizations. Additionally, it enables the employees to access the training materials from anywhere at any time which have overcomes many challenges with the traditional training methods. Also, web based training provides a more enjoyable training environment due to the presentation of the materials in many forms (e.g. video, audio, animation and etc.). With the increasing demand to improve the employees' skills and knowledge reflection on their work performance and their productivity, such system enables the organizations to offer the training for their employees without any adverse effect on work performance. According to Hsia and Tseng [16] and Lim et al. [17] web-based training systems reduce the training cost and time and enable the employees to attend training sessions.

Despite the significant of the system, few studies related to the acceptance of such system has been conducted [32][7] till now. The purpose of this study is to investigate the acceptance of web based training systems by the public sector's organizations employees, since according to Dadayan and Ferro [12] and Venkatesh et al. [31], the number of studies which have been conducted to examine the acceptance of information technology by the public sector employees is very limited.

In the meantime, research on acceptance of e-learning system by universities' students and organizations' employees has become a focus of interest for a lot of information technology researchers. They have identified many constructs that influence people's intention to use e-learning systems [16], [18], [24], [33]. These researchers had used many models and theories to explain the acceptance of information technology. The modern model had been used to describe such acceptance is Unified Theory of Acceptance and Use of Technology (UTAUT) [31]. So far, there is no trail to extend this theory to include other successful factors for e-learning systems acceptance. This study makes an effort to extend the original UTAUT to include three critical success factors in the e-learning context including, system flexibility, system enjoyment and system interactivity [16], [24], [1], [26], [7] (see figure 1).

II. THEORETICAL FRAMEWORK AND HYPOTHESES

A. *Unified Theory of Acceptance and Use of Technology (UTAUT)*

UTAUT is one of the most important information technology acceptance theories [18], [31]. This is due to the fact that it could predict the acceptance of an information technology in approximately 70% of the cases. Comparing with the Technology Acceptance Model (TAM), it could only predict the acceptance of an information technology in approximately 40% of the cases. Additionally, UTAUT investigated the effect of four moderators (Age, Gender, Experience, and Voluntariness of use) on the relationships between its constructs and behavioral intention to use an information technology. On the other hand, the validity of UTAUT in the information systems context needs further testing [18].

Therefore in this study the extended UTAUT with some of information systems successful factors will be tested. Thus, the following hypotheses have been proposed for this study.

H1. Performance expectancy will have a direct effect on the employees' intention to use web-based training systems.

H2. Effort expectancy will have a direct effect on the employees' intention to use web-based training systems.

H3. Social influence will have a direct effect on the employees' intention to use web-based training systems.

H4. Facilitating conditions will have a direct effect on the employees' intention to use web-based training systems.

H5. The relationship between performance expectancy and behavioral intention will be moderated by Age and Gender.

H6. The relationship between effort expectancy and behavioral intention will be moderated by Age, Gender and Experience.

H7. The influence of social influence on behavioral intention will be moderated by Age, Gender and Experience.

B. System Flexibility

Many scholars introduced the perceived flexibility as one of the critical factors to understand user's behavioral acceptance of e-learning systems [16], [24], [15], [22]. Flexibility of e-learning system was defined as the degree to which an individual believes that he/she can access the system from anywhere at any time [16]. Adapting this construct to examine the acceptance of web based training systems by public sector employees suggests that they will accept web based training systems if they believe that they can access the system from anywhere at any time. Hsia and Tseng [16]; Sahin and Shelley [24]; Nanayakkara [22] and Lim et al. [17] argued that perceived flexibility of e-learning system positively influence user's intention to use e-learning systems. Therefore, the following hypothesis is proposed.

H8. System flexibility has a positive effect on employees' intention to use web based training systems.

C. System Interactivity

The interactions between instructors and learners, amongst learners themselves, and learners with the organization are the key elements of learning process [1]. Development of technologies which are used in the e-learning context increases the ability of individuals to interact from anywhere at any time. Adapting this construct (system interactivity) to the web-based training systems suggests that the public sector employees think that by using web based training systems will enable them to interact among each other and other members of the organizations from anywhere at any time.

Although, few studies have paid attention to this factor, Abbad et al. [1] suggested that system interactivity has indirect impact on the user's intention to use e-learning systems through perceived usefulness and perceived ease of use. Davis [14] found that perceived usefulness and perceived ease of use fully mediates effect of system's characteristics on user's intention to use the e-mail technology. Consequently, because many scholars agree that perceived performance expectancy and perceived effort expectancy are similar to perceived usefulness and perceived ease of use [31], [33] [18], the following hypotheses are proposed.

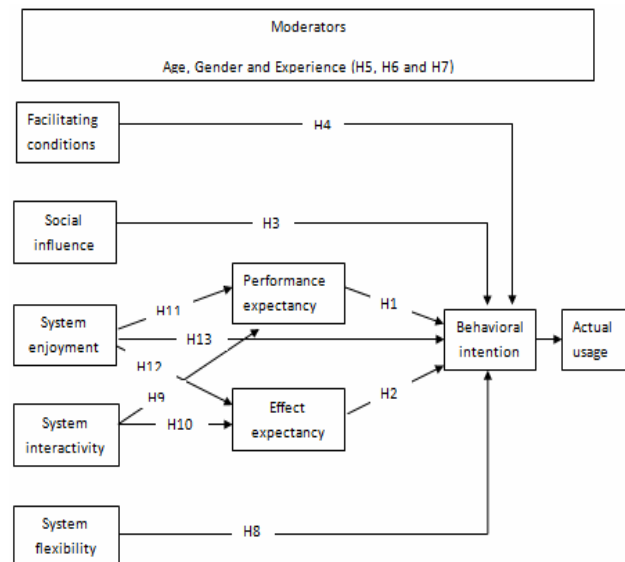


Figure 1. theoretical research framework

H9. System interactivity has a positive impact on perceived performance expectancy.

H10. System interactivity has a positive impact on perceived effort expectancy.

D. System enjoyment

Scholars found that activities using information technology should be enjoyable and accepted by the users [26], [7], [11], [8]. Perceived enjoyment refers to the degree to which a user believes that using a system will be enjoyable, apart from the effect of such system on his/her job performance [11]. Adapting system enjoyment factor to examine the acceptance of web-based training systems by public sector's employees suggests that those employees will accept such system if they believe that the process of using the system will be enjoyable. In the effect of perceived enjoyment, many studies indicated that perceived enjoyment has direct effect on user's intention to use e-learning systems and indirect effect on the behavioral intention through perceived ease of use and perceived usefulness [26], [7], [8]. Thus, the following hypotheses are proposed.

H11. System enjoyment has a direct impact on perceived performance expectancy.

H12. System enjoyment has a direct impact on perceived effort expectancy.

H13. System enjoyment has a direct impact on employees' intention to use web-based training systems.

III. RESEARCH METHODOLOGY

A. Data collection method

A questionnaire has been designed and used to collect data. This research is going to measure seven constructs and the questionnaire was divided into eight sections. The first section includes information regarding the characteristics of respondents (e.g. age, gender, having personal computer, having internet access, having experience with e-learning systems), while each one of other sections includes questions that measure each of this research model constructs. Finally the last section includes questions that measure employees' intention to use web-based

training systems. The total number of questionnaire's items is 43. Each item is measured using 7-point likert scale (appendix A). All such items have been adapted from [1], [24], [31].

B. Sampling and instrument validation

The validity is concerned with reducing the possibility of getting incorrect answers during the data collection period [25]. In this research, content validity was carried out through questionnaire pre-test process [34]. The questionnaire was modified based on the comments received from ten employees who responded to the questionnaire before it was distributed to the sample of study.

In total, five hundred (500) questionnaires had been distributed to the public sector's employees in Jordan. Eventually, only two hundred and ninety employees at a response rate of 58% had successfully completed and returned the questionnaire. Lately, the Structural Equation Model (SEM) approach and AMOS software was used to analyze the data.

IV. DATA ANALYSIS AND RESULTS

A. Confirmatory Factor Analysis

In order to evaluate the factors' construct validity and the reliability of the measurement's items, AMOS 16.0 statistical software (structural equation model) was used to carry out the Confirmatory Factor Analysis (CFA).

Table I shows the loadings of constructs and items which were used to measure them. As shown, the loadings of each factor were greater than the acceptable threshold level 0.5.

Additionally, in order to assess the overall metric model fit, five measures have been applied namely, ratio chi-square to degrees of freedom ($X^2/d.f.$), Root Mean Square of Error Approximation (RMSEA), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI). The final model of this study was obtained through the process including deleting items, since seventeen items (PE 1, PE 5, PE6, EE 1, EE 2, EE 3, EE4, SIN 4, SIN 5, SE 3, SE 4, SE 5, SF 3, SI 2, SI 5, BI 5 and FC 4) have been excluded and re-estimating the model. Consequently, it met all previous goodness of fit measures. Since ($X^2/d.f.$) value is below the 3 threshold [5], RMSEA's value is below the 0.08 threshold [6], GFI value is above the 0.9 threshold [5], AGFI value is above the 0.8 threshold [5], while CFI value is above the 0.9 threshold [27]. Table II presents the values of previous model-fit measures.

B. Structural Model and Results

In the previous section, CFA was performed to assess the model's goodness of fit and loading of the research constructs with items which were used to measure them. In this section, a path analysis for structural model was conducted to examine the hypothesized relationships that help to predict employees' intention to use web-based training systems. Figure 2 explains the structural model with the assessed path coefficient and the adjusted coefficient of determination (R^2) scores, while table III shows the overall results of hypotheses' examining.

The findings of this study revealed that all of the proposed relationships are accepted and statistically significant. According to the modification indices (SEM analy-

TABLE I.
CONFIRMATORY FACTOR ANALYSIS

Constructs	Items	Loadings
Performance Expectancy	PE 2	.956
	PE 3	.965
	PE 4	.963
Effort Expectancy	EE 5	.972
	EE 6	.958
System Interactivity	SIN 1	.921
	SIN 2	.928
	SIN 3	.951
System Enjoyable	SE 1	.960
	SE 2	.947
System Flexibility	SF 1	.974
	SF 2	.964
	SF 4	.895
Social Influence	SI 1	.897
	SI 3	.949
	SI 4	.890
Facilitating Conditions	FC 1	.936
	FC 2	.958
	FC 3	.944
	FC 5	.927
Behavioral Intention	BI 1	.935
	BI 2	.961
	BI 3	.964
	BI 4	.950

TABLE II.
VALUES OF OVERALL MODEL-FIT MEASURES

Model-fit measures index	Recommended values	scores
Chi-square to degrees of freedom ($X^2/d.f.$)	≤ 3	1.149
Comparative Fit Index (CFI)	≥ 0.90	.997
Root Mean Square of Error Approximation (RMSEA)	≤ 0.08	.023
Adjusted Goodness of Fit Index (AGFI)	≥ 0.80	.912
Goodness of Fit Index (GFI)	≥ 0.90	.933

sis), there were three new significant relationships: (i) between Effort Expectancy (EE) and Performance Expectancy (PE), (ii) between System Flexibility (SF) and Performance Expectancy (PE), and (iii) between Facilitating Conditions (FC) and Effort Expectancy (EE). These four relationships have been intervened within the structural model, see table III and figure 1.

Interestingly, the first hypothesis (H1) revealed that performance expectancy will have direct effect on the employees' intention to use web-based training systems. This hypothesis was accepted, since the statistical result showed that there is strong significant relationship between the performance expectancy and employees' intention to use web-based training systems (.107^{***}) (Table III), while the effect was moderated by age, gender and experience (H5) (the effect was important to younger male employees who have well internet experience. This result had also been confirmed by prior studies [31], [33], [13]. The second relationship (H2) indicated

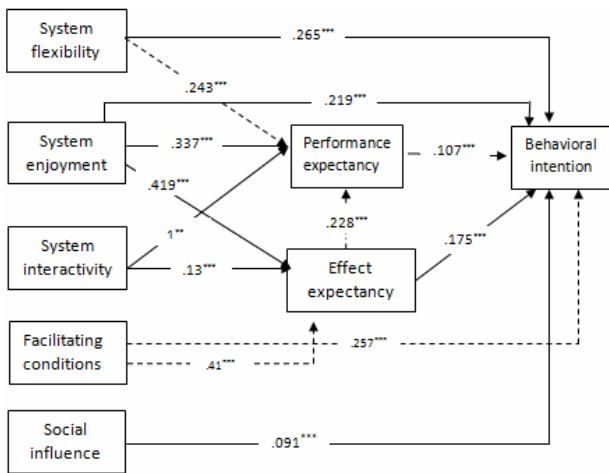


Figure 2. research structural model

TABLE III.
HYPOTHESES TESTING RESULTS

Hypotheses	Path	Path coeff.	remarks
H1	Performance expectancy → intention	0.107***	Accepted
H2	Effort expectancy → intention	0.175***	Accepted
H3	Social influence → intention	0.091***	Accepted
H4	Facilitating condition → intention	0.257***	Accepted
H5	Performance expectancy and intention relationship is moderated by Gender and Age	Yes	Accepted
H6	effort expectancy and intention relationship is moderated by Age, Gender and Experience.	Yes	Accepted
H7	Social influence and intention relationship is moderated by Age, Gender and Experience.	Yes	Accepted
H8	System flexibility → intention	0.265***	Accepted
H9	System interactivity → performance expectancy	0.1**	Accepted
H10	System interactivity → effort expectancy	0.132***	Accepted
H11	System enjoyment → performance expectancy	0.337***	Accepted
H12	System enjoyment → effort expectancy	0.419***	Accepted
H13	System enjoyment → intention	0.219***	Accepted
New detected relationships			
	Effort expectancy → Performance expectancy	.228***	Accepted
	Facilitating Conditions → Effort Expectancy	.410***	Accepted
	System Flexibility → Performance Expectancy	.243***	Accepted

** P-value < 0.05 level, and *** P-value < 0.01 level

that effort expectancy has direct effect on the employees' intention to use web-based training systems. This hypothesis was also accepted, since statistical result indicated that there is strong relationship between effort expectancy and employees' intention to use web-based training systems (.175***) (Table III), this relationship was not moderated by gender, age, and experience (H6). Otherwise, statistical results revealed that there is new significant relationship between effort expectancy and performance expectancy (.228***) (Table III). This result is consistent with that of Taylor and Todd [28] and Davis [14] who indicated that effort expectancy (ease of use) has affected on performance expectancy (usefulness) and user attitude.

The third hypothesis (H3) indicated that there is significant relationship between social influence and employees' intention to use web-based training systems. Consequently, statistical results indicated that there is a relation-

ship (0.091***) (Table III) between social influence and user's intention to use web training, while the latter's effect is moderated by Age, Gender and Experience(H7), since this relationship is salient to older women and decreases with experience. This finding has supported the findings of Venkatesh et al. [31] and Venkatesh and Morris [30], who argued that the effect of social influence on individual's intention to use an information technology is more salient to older women and decreases with experience. Focusing in this relationship, it can be assumed that employees pay much attention about the opinions of other people who are important to them, when they intend to use web-based training systems. Otherwise, the opinions of these people who important for employees (e.g. their managers) influence them to use web-based training systems.

The fourth hypothesis (H4) indicated that facilitating conditions have direct effect on the employees' intention to use web-based training systems. This hypothesis was accepted since the statistical result revealed that there is a strong relationship (.257***) (Table III). This result has also been confirmed by Thompson et al. [29] and Ajzen [2]. However, it is contrasted with Venkatesh et al. [31] who argued that the facilitating conditions do not have effect on an individual's intention to use an information system, but they have direct effect on the actual use beyond that explained by behavioral intention.

Similar to other studies [16], [17], [22], the relationship between Flexibility of web based training and employees' intention to use web training (H8) has been confirmed (.265***) (Table III). This relation possibly indicates that, a trainer intends to use web-based training systems, if he/she believes that he/she can access the system from anywhere at any time. In other words, trainees will participate in the e-training process if they believe that they can choose their training equipment and time themselves. Furthermore, similar to Hsia and Tseng, [16] study, this study found that there is also a relationship between system flexibility and performance expectancy (0.243***) table III.

System interactivity is concerned; since it refers to the degree to which employees believe that web based training can provide interactive communication between members of organizations and trainees and between trainees themselves. This study provides evidence that system interactivity has direct effect on the performance expectancy (0.1**) (Table III) (H9) and effort expectancy (.132***) (Table III) (H10). That possibly means when employees intend to use web based training to interact with members of an organization (e.g. help disk) and together, they also believe that web based training will enhance their training performance and make the training much easier. This result is in contrast with Abbad et al. [1] and similar to Lim et al. [17] and Davis [14].

As regard to the eleventh hypothesis (H11), twelfth hypothesis (12) and thirteenth hypothesis (13) which revealed that system enjoyment has a positive impact on perceived performance expectancy, perceived effort expectancy, and the employees' intention. These hypotheses were accepted, since statistical results showed that system enjoyment has a strong impact on performance expectancy (.337***) (Table III); has a strong impact on effort expectancy (.419***) (Table III); and has direct effect on the employees intention (.219***) (Table III). These results were supported by vary previous studies.

Such as Chatzoglou et al. [7] and Abbad et al., [1] found that there are significant relationships between system enjoyment usefulness (performance expectancy), ease of use (effort expectancy) and behavioral intention.

V. SUMMARY

Overall, six direct relationships have been found statistically significant to the employee's intention (table IV). These relations are between performance expectancy, effort expectancy, system enjoyment, facilitating conditions, system flexibility and social influence with employees' intention to use web-based training systems. Interestingly, the strongest relationship is found between system flexibility and user's intention (.265) (Table IV). Therefore, web-based training systems should be flexible in any time and place. The second important relationship is the one between facilitating conditions and employee's intention (.257) (Table IV). The result implies that organizations should pay attention to help their employees to obtain the resources and knowledge needed for web training process. The third important relationship is between system enjoyment and employees' intention (.219) (Table IV). In this respect, user interface and training materials' format should be enjoyable. Continuously, the fourth important direct relationship is between effort expectancy and employees' intention (.175) (Table IV). The relation of employees' intention with the performance expectancy (.107) (Table IV) and social influence (.091) (Table III) were the last two important relationships. Otherwise, this study found that there are four factors having direct impact on the performance expectancy and effort expectancy. Those factors are system flexibility, system interactivity, system enjoyment and facilitating conditions. In other words, these factors make the system much usefulness and ease to use. These results are consistent with that of Davis [14] who indicated that system characteristics have impact on the usefulness and ease of use.

As regards to the relationships of proposed model which were not supported by the statistical analysis, they must be excluded from the model. In detail, one relationship was denied by this study. This relationship was between facilitating conditions and actual use, since the findings of this study indicated that there was a direct relationship between facilitating conditions and employees' intention. That is consistent with Thompson et al. [29] and Ajzen [2] who indicated that there is significant relationship between facilitating conditions and user's intention to use an information system, but that in contrast with Venkatesh et al. [31] findings, which rejected this relationship.

VI. CONCLUSION AND RESEARCH LIMITATIONS

A. Conclusion

This research has been conducted to collect data from public sector's employees in Jordan in order to examine the acceptance of web-based training systems by those employees. The results of this research have indicated that six factors, namely facilitating conditions; performance expectancy, effort expectancy, system flexibility, system enjoyment, and social influence have direct effect on the employee's intention to use a web-based training systems. Furthermore, system interactivity, system enjoyment,

TABLE IV.
STANDARDIZED CAUSAL EFFECT OF THE MODEL CONSTRUCTS.

Factors	Determinants	Direct Effect	Indirect Effect	Total Effect
Performance Expectancy $R^2=0.625$	SE	.337	.096	.433
	SIN	.100	.030	.130
	EE	.228	-	.228
	SF	.243	-	.243
Effort Expectancy $R^2=0.845$	FC	-	.094	.094
	SE	.419	-	.419
	SIN	.132	-	.132
	FC	.410	-	.410
Behavioral Intention $R^2=0.838$	SE	.219	-	.338
	SIN	-	.119	.037
	FC	.257	.037	.339
	SI	.091	.082	.091
	SF	.265	-	.291
	EE	.175	.026	.199
PE	.107	.024	.107	

system flexibility, and facilitating conditions, have affected the performance expectancy and effort expectancy.

These results showed that public sector's employees intend to use web-based training systems to improve their training and complete it more quickly, since performance expectancy has strong effect on their intention to use web-based training systems.

Additionally, one of the study contributions is that, it found that perceived system flexibility impacts intention of public sector's employees to use web-based training systems, thus, web-based training systems' designers should assure that the system's components are accessible from anywhere at any time. Further, the employees pay much attention for the opinions of people who are important for them (e.g. their supervisors or their peers); since the result showed that social influence impacts the employees' intention. Knowledge and resources which necessary in the training process are concerned, since the result indicates facilitating conditions have a strong effect on the employees' intention to use web-based training systems. Therefore, managers should take into their account employees' knowledge and resources which are needed in training process, in order to motivate them and increase their interest to use web-based training systems.

Furthermore, the employees should feel joyful and can contact other people (e.g. other trainees, trainers or organization's members) during the training process, in order to realize the performance expectancy and effort expectancy of training process, since the statistical result indicates that system enjoyment and system interactivity have direct effect on the performance expectancy and effort expectancy, and have indirect effect on the employees intention to use web-based training systems (Table IV).

B. Research Limitations and Future Research

The first limitation of this research relates to sample size, since small one was taken into consideration (290). Second, the other limitation relates to measurement items, whereas just high rate items (α) were taken into consideration. So, further research should pay attention to employees' characteristics (such as, computer anxiety and computer self-efficacy) and assess the changing of these characteristics over time. Furthermore, as prior mentioned

regarding the lack of relevant studies, more studies should be conducted in this context (acceptance of an information technology by public sector's employees) to support this study's findings

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