Journal of Posthumanism

2025
Volume: 5, No: 5, pp. 3259–3279
ISSN: 2634-3576 (Print) | ISSN 2634-3584 (Online)
posthumanism.co.uk

DOI: https://doi.org/10.63332/joph.v5i5.1726

A Proposed Model for the Adoption of E-Learning Systems in Jordanian Universities

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Abstract

The purpose of this study is to propose a unified model by integrating the Unified Theory of Acceptance and Use of Technology (UTAUT), Task-Technology Fit model (TTF), Management Support, Computer Self-Efficacy, Perceived Trust, and Perceived Autonomy to investigate continuance intention to use e-learning systems within the educational institutions. The study used a deductive approach and quantitative methodology, in which causal hypotheses were tested to assess the connection between study variables. Data was collected by the use of a self-administered questionnaire, which was sent electronically to the targeted academics at both public and private universities in Jordan. Out of the returned surveys, 12 were invalid and 187 responses were usable for analysis. This study's results verified that technology characteristics have the highest impact on the scholars' perceived TTF, which indirectly led to their continuance intention to use e-learning system. In relation to the four constructs of UTAUT, it was found that performance expectancy and facilitating conditions are more responsible in the overall impact on the continuance intention. Amongst the exogenous variables, the results revealed that computer self-efficacy has the greatest impact. Essentially, the results strongly supported the research model to predict the continuance intention to use e-learning system by testing UTAUT, TTF, and other key conjectured variables. This paper contributes in providing a notable attention to the underlying factors that influence the continuance intention to adopt e-learning systems. Consequently, this paper integrates UTAUT and TTF and incorporates other factors into the unique proposed model to predict the continuance intention to adopt e-learning systems. On the practical side, this research also provides insights for developers and universities that can help them to improve their e-learning system to ensure sustained usage.

Keywords: *UTAUT, TTF, e-Learning, Management support, Computer self-efficacy, Trust, Autonomy, Jordan.*

Introduction

Although e-learning acceptance is largely considered in literature, little attention was paid to the scholars' perspective towards adopting e-learning systems, especially in the developing countries. According to (Valencia-Arias, Chalela-Naffah, & Bermúdez-Hernández, 2019), the acceptance of technology varies between nations due to differences of cultural, economic and social differences between developed and developing countries. Although some studies investigate technology adoption by incorporating the Unified Theory of Acceptance and Use of Technology UTAUT with Task Technology Fit Model TTF (Wan et al., 2020, Tarhini et al., 2016, Bozorgkhou, 2015, Zhou et al., 2010, Oliveira et al., 2014), it is recommended to enhance

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the existing theory by the inclusion of other determinants (Venkatesh et al., 2003). Thus, four variables (Management Support, Computer Self-Efficacy, Perceived Trust, and Perceived Autonomy) were taken into account by the current research as they are considered important variables in technology acceptance. Incorporating these new variables might improve the predictive value of the existing theory in acceptance of technology. Additionally, the existing literature addressing the implementation of e-learning is conducted in developed countries, while studying the phenomenon in developing countries is inadequately growing (Valencia-Arias et al., 2019, Tarhini et al., 2016). Thus, the aim of this study is to analyse the perspectives of university professors to better understand the level of acceptance of e-learning tools from Jordan as a case study of a developing country. Specifically, this study identifies critical factors that determine the use of e-learning systems among faculty members from all higher education institutions in Jordan.

Literature Review and Developing Hypotheses

Task Technology Fit

Task-Technology Fit Model (TTF) (Goodhue and Thompson, 1995) aimed at setting the congruence between multiple factors influence successful performance of using information systems (IS). It identifies a set of challenges encounter users while adopting IS in performing their tasks. Concerning e-learning system, TTF refers to the ability of the e-learning system to support instructors in the range of learning activities they engage in. Managing IT entails accomplishing the best fit between technology, user and task. This implies the capacity of enhancing the fit between these three aspects. In performing a given task, it is important that individuals are sufficiently motivated and knowledgeable. Further, the technology must present adequate functionality and performance in offering support to the task. In addition, it is important that users be satisfactorily trained in the application of technology. Ammenwerth et al. (2006) indicated that inadequate fit might result in issues during projects implementation. In demonstrating the significance of fit between characteristics of technologies and user tasks, Goodhue and Thompson (1995) projected TTF theory in order to accomplish the impacts of individual performance. Antecedents such as individual characteristics, task characteristics, and technology characteristics influence TTF. Ammenwerth et al. (2006) stated that the quality of fit relies on several impacting attributes including attributes on individual level, attributes on task level, and attributes on technology level. Attributes on individual level include motivation and interest towards the task performed, IT knowledge, flexibility and openness towards new working manners, organizational context, team culture, collaboration within a team, and organizational politics. Attributes on task level includes task complexity, organization of the tasks accomplished, and activities and their interdependence. Attributes on technology level includes constancy and usability of hardware or software tool, and functionality.

Individual Characteristics

The acceptance of using technology does not only depend on technology itself, but also relies on the level of skill or expertise of the individual using the technology (Goodhue and Thompson, 1995). The TTF model considers the extent to which users believe that the technology will meet their needs and abilities. Individual characteristics are the distinguishing factors between people and include their demographic, physiological, and cognitive differences. Individual characteristics, such as experience of using technology and emotional status toward using technology, have a direct effect on the intention to use various technology applications. An individual experience with using technology was found to be positively associated with

technology adoption (Lee et al., 2011, Sun et al., 2008).

Task Characteristics

Task is generally defined as the action carried out by an individual in turning inputs into outputs (Goodhue and Thompson, 1995). In learning context, the task of instructors includes communicating with students, accessing learning materials, and performing interactive activities such as exams. Principally, the effects of task characteristics on TTF have been investigated by previous studies in various contexts (Goodhue and Thompson, 1995, Yen et al., 2010, Gan et al., 2017). Therefore, this study posits that task characteristics a key antecedent of instructors' perceived TTF while using e-learning system. TTF states that individuals' choice of technology does not depend only on their attitudes and perceptions, but also on technology fit with the task requirements and characteristics. Oliveira et al. (2014) states that individuals are supposed to adopt a technology if they found it fit with their daily tasks and improve their performance.

Technology Characteristics

It has been claimed that certain technology characteristics, such as technological complexity and reliability, have an effect on successful implementation (Attewell, 1992, Sharma and Yetton, 2003). Task characteristics may motivate users to adopt certain technology. In the TTF model, technologies are seen as the tools utilized by individuals to finish their task. Technology is an e-learning program designed for the purpose of communicating with students, managing quizzes, and presenting and sharing learning materials. According to the TTF model, such technological characteristics can better improve learning environment (Wan et al., 2020) and the scholars' performance. If the scholars do not have the required technology characteristics or feels it difficult to realize it, they still feel unsatisfied, and indirectly affect their continued intention.

Based on these findings, the following research hypotheses were put forward:

H1: Individual characteristics significantly affect the task technology fit

H2: Task characteristics significantly affect the task technology fit.

H3: Technology characteristics of e-learning systems significantly affect the task technology fit.

H4: Task technology fit significantly affects continuance intention to use e-learning systems.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model is largely used in recent years to investigate the behavioral intentions to use technology. It was developed by Venkatesh et al. (2003) by merging the constructs of eight social theories including Technology Acceptance Model TAM (Davis, 1989). It claims that influence of a technology is based on four core constructs. These include performance expectancy, effort expectancy, social influence and facilitating conditions.

In the context of e-learning, a study of Yakubu and Dasuki (2019) investigates factors that influence the acceptance and use of educational technology in higher education institutions. It concludes that performance expectancy and effort expectancy influence the behavioural intention to use learning system. It was also revealed that the actual usage of the e-learning system was determined by facilitating conditions and behavioural intentions. Results of Hanif et al. (2018) indicates that learners' perceptions towards system usefulness and ease of use are positively influenced by subjective norm, perception of external control, system accessibility, enjoyment, result demonstrability and subjective norms. A study of Gunasinghe et al. (2019)

revealed that performance expectancy, effort expectancy, facilitating conditions, were significantly influence scholars' adoption of e-learning systems.

Performance Expectancy

According to Venkatesh et al. (2003), performance expectancy is defined as the degree to which an individual believes in realizing job performance with the help of an IS. In the E-learning context, E-learning would be of great assistance for users, because educators are thus enabled to instantly accomplish the learning activities, or improve their education skills and performance. Consistent with the UTAUT and foregoing literature (Wang et al., 2009, Wong and Huang, 2011), a significant positive association was discovered between the two constructs. Therefore, the given below hypothesis was presented:

H5: Performance expectancy significantly affects continuance intention to use e-learning systems.

Effort Expectancy

Effort expectancy was derived out from the Technology Acceptance Model TAM (Davis, 1989). It is equivalent to the perceived ease of use that is associated with the use of a system (Venkatesh et al., 2003). It is a strong determinant of behavioural intention and the actual usage of technology (Jaradat et al., 2020, Tarhini et al., 2016, Salloum and Shaalan, 2018), especially when the technology is initially used. For this study EE is defined as the ease of using the e-learning system, and it is realised that EE will affect users' behavioural intention to use e-learning system. Thus, the following hypothesis was presented:

H6: Effort expectancy significantly affects continuance intention to use e-learning systems.

Social Influence

According to Venkatesh et al. (2003) social influence is defined as the degree to which a person realizes how the others believe that a new IS should be used. As stated by the previous studies, an individual's intention for using new technology is created through the social influence (Abbad, 2021; Wang et al., 2009, Tan, 2013, Yoo et al., 2012, Wong and Huang, 2011). Based on earlier studies and the UTAUT (Venkatesh et al., 2003, Venkatesh, 2000), social influence is found to be a significant contributing factor of continuance intention to use E-learning. Consequently, the following hypothesis was developed:

H7: Social influence significantly affects continuance intention to use e-learning systems.

Facilitating Conditions

Facilitating conditions is defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003). Users' acceptance of IS depends mainly on the supporting conditions provided by the organisation. In the context of e-Learning these supporting conditions include tangible IT resources, knowledge, availability of the internet, and IT support technicians. Therefore, the following hypothesis was developed:

H8: Facilitating conditions significantly affects continuance intention to use e-learning systems.

Management Support

Management support denotes to the encouragement of management in an organization. In

organizational settings, management is a significant factor in shaping organizational values, attitudes, beliefs, and consequently behaviours (Lin and Wu, 2004). In the context of computer technology adoption, top management support is obviously associated with successful implementation of change and innovation (Davis et al., 1989) and consequently the perceptions toward technology adoption. Through management support, users would be more mindful about the importance of technology and thus more encouraged to use it. Hence, deficient support impedes the use of technology (Alqahtani, & Rajkhan, 2020; Sharma and Yetton, 2003). Accordingly, employees' perceptions of using e-learning systems is affected by management support. In the light of these research outcomes, the following hypothesis was formulated:

H9: Management support significantly affects continuance intention to use e-learning systems.

Computer Self-efficacy

Computer self-efficacy is defined by Bandura (1986) as "the belief that one has the capability to perform a particular behaviour". In the context of using technology, computer self-efficacy represents the individual's perceptions of his or her ability to use computers in the accomplishment of a task, rather than reflecting simple component skills (Katsarou, 2021). Empirical studies have demonstrated the significant influence of computer self-efficacy on technology adoption (Okuonghae, Igbinovia, & Adebayo, 2022), and several findings have shown the role of computer self-efficacy on determining users' computing behaviours (Sendogdu & Koyuncuoglu, 2022). Thus, the following statement was hypothesized:

H10: Computer self-efficacy significantly affects continuance intention to use e-learning systems.

Perceived Trust

Research on trust of technology is rapidly growing in the literature, and numerous studies have been conducted to examine the effect of trust on the adoption of different aspects of technology such as cloud computing (Jaradat et al., 2020, Alharbi, 2017), internet banking (Slade et al., 2015), and e-learning (Almaiah et al., 2019). In these studies, trust is usually directly linked to the attitude of users towards adopting, acceptance and usage of a new technology. Therefore, to guarantee adequate intention to use a new technology, it should offer superior services with implementing it effectively and securely. On the contrary, distrust could lead to increased resistance to use new technologies (Alharbi, 2017). To this end, the following hypothesis was postulated:

H11: Perceived trust significantly affects continuance intention to use e-learning systems.

Autonomy

According to different authors such as (Giesbrecht et al., 2012, Roca and Gagné, 2008, Lakhal et al., 2013), autonomy refers to freedom of choice and to the possibility of leading a self-determined life that is caused by one's own actions. Based on self-determination theory (Deci and Ryan, 2012), people are more engaged and motivated to take action at work when they feel that they are able to have a positive effect at work. In the context of learning, autonomy is important in shaping the intention to use e-learning technology by educators (Lenkaitis, 2020; Roca and Gagné, 2008, Sørebø et al., 2009). Thus, the following hypothesis was posed:

H12: Perceived autonomy significantly affects continuance intention to use e-learning systems.

Integrated Model of TTF and UTAUT

The TTF (Goodhue and Thompson, 1995) and the UTAUT model (Venkatesh et al., 2003), address the influence of adopting IS from different perspectives as they focus on different aspects. Each model focuses on a certain standpoint, which cannot be generalised in its entirety for any possible context and for all forms of IS. To complement the strengths and to offset the weaknesses of each viewpoint, it is recommended to combine these two models. The TTF and UTAUT models supplement each other, thus combining them means gathering their strengths in a valuable manner for improved understanding of the factors influencing the adoption/intention to adopt IS. Likewise, incorporating them into an integrated model can offset the weaknesses of each. For instance, the TTF model do not consider how the environmental factor; social influence, and organisational factor; facilitating conditions would complement the other constructs on the way of influencing IS adoption. Additionally, none of the two models includes the perceived autonomy and perceived trust toward intention to adopt IS. Beside the two associated constructs, connecting constructs of both models would improve our understanding of the continuance intention to adopt e-Learning.

Regarding the context of e-learning systems, the TTF and UTAUT models do not address some factors, which may limit their predictive ability for social networking technology. The limitation can be overcome by extending these models with Management support, Computer self-efficacy, Perceived trust, and Perceived autonomy.

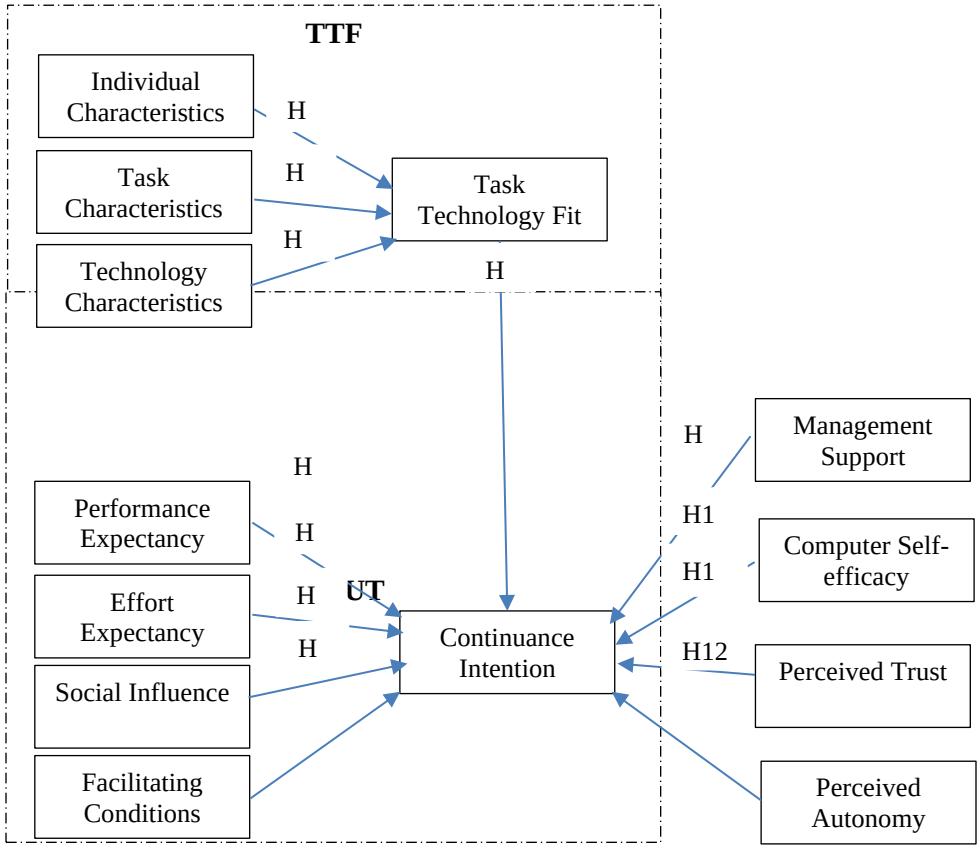

Figure 2: The Proposed Model and Hypotheses

Method

Data Collection

To obtain data from private and public universities in Jordan, a survey was carried out. Questionnaires were distributed to university academics by email and other electronic platforms in August 2021. Of all the completed questionnaires, 12 were discarded as being invalid and 187 were subject to quantitative analysis. No personal identification details were contained in the questionnaires and all responses were treated confidentially. There were two sections to the questionnaire, the first of which covered demographic and professional details such as age, gender, type of university, and school. On the other hand, the second section was designed to examine participants' perceptions of each variable involved in the model. The responses were assessed using a five-point Likert-type scale. All items can be found in the appendix.

Respondents' Profile

The demographic and professional features of the sample are shown in Table 1. It is clear to see that the sample consisted of 20 women (10.7%) and 167 men (89.3%). Moreover, 40.6% of participants (40.6%) were aged 41-50. 111 participants (59.4%) worked in public universities. A majority of respondents had between 1 and 5 years of teaching experience. The data also indicates that 73.3% of the respondents worked in humanities-related academic institutions.

Measure	**Items**	**Frequency**	**Percentage**
Gender	Male	167	89.3
	Female	20	10.7
Age	30 - ≤ 40	50	26.7
	40 - ≤ 50	76	40.6
	50 - ≤ 60	53	28.3
	60 - ≤ 70	8	4.3
Experience	1 - ≤ 5	48	25.7
	5 - ≤ 10	36	19.3
	10 - ≤ 15	47	25.1
	15 - ≤ 20	24	12.8
	20 - ≤ 25	28	15.0
	25 - ≤ 30	4	2.1
University	Public	111	59.4
	Private	76	40.6
School	Scientific	50	26.7
	Humanity	137	73.3
Note: n = 187			

Table 1: Demographic and Professional Characteristics of the Sample

Assessment of Measurement and Model Fit

To evaluate the model fit, five indices were selected. These indices were designed to assess the suitability of confirmatory model fit. The findings of the Chi-Square test showed that the value was (1219.43). This significance value (0.000) indicates that there is a statistically significant

difference between the proposed data model and the current model. Moreover, the value pertaining to the chi-square value of the model freedom was found to be 3.236, which falls within the desire value range. The CFI, GFI, and RMSEA values were found to be 0.920, 0.897, and 0.064**,** respectively. All such values almost fitted the critical desired values (outlined in the specified column) falling within the acceptable high range. This suggests that the indicators were well fitting.

Fit Index	Recommended value	Structural model
χ^2	-	1219.43
$\chi 2/df$	(< 5)	3.236
CFI	(0 – 1.00)	0.920
GFI	(0 – 1.00)	0.897
RMSEA	(0 – 0.08)	0.064

Sources: Kline (2010) and Hair et al. (2010)

Given the results mentioned, above, it is evident that the model is good. Thus, further tests can now be carried out to determine the reliability test, convergent, discriminant, and divergent validity, which is critical in assessing whether the psychometric properties of the measurement model are adequate.

Reliability

Two different methods were employed to evaluate the reliability of the questionnaire tool, the first of which was the Cronbach alpha (α) test, which assesses the internal consistency of the items for each dimension. This approach measures the variance assigned by the factor (or scale) based on the variance of all questions. The second method was McDonald's proposed approach (symbolized by ω), which examines the squared standardized loading in relation to the total sum of the squared standardized factor loading. Table 4 presents the results of these tests.

Factor	**No. of items**	**Cronbach (α)**	**Macdonald (ω)**
Task characteristics	3	0.838	.0898
Technology characteristics	3	0.747	0.754
Individual characteristics	3	0.723	0.725
Task technology fit	3	0.803	0.809
Performance expectancy	4	0.860	0.879
Effort expectancy	3	0.787	0.793
Social influences	3	0.866	0.711
Facilitating conditions	3	0.801	0.792
Perceived Trust	4	0.891	0.893
Perceived autonomy	3	0.770	0.820
Continuance intention	3	0.914	0.916
Management support	3	0.823	0.846
Computer self-efficacy	3	0.790	0.799

Table 4: Reliability using Cronbach's Alpha (α) and McDonald Approaches

Table 4 presents the reliability results for each factor under investigation, which were obtained using the Cronbach (α) and MacDonald approaches. The findings of the Cronbach alpha (α) test

indicate that the minimum observed value for perceived autonomy was (0.770), whilst the minimum observed value for the social influences variable using the McDonald approach (ω) was found to be (0.711). The findings thus indicate high reliability (above 0.700), (Cooper et al., 2006). All other values were higher than the minimum observed values, indicating that the independent variables were highly reliable.

Convergent Validity

Confirmatory Factor Analysis (CFA) was also performed to validate the research items, and the results of this test are presented in Table 5. The minimum loading observed value was found to be 0.547 for task characteristics, whilst the maximum loading value was found to be for task technology (0.976). As the minimum loading value was higher than the minimum loading required (0.50 or greater), this suggests that the convergent validity is adequate.

Divergent Validity

Cross loadings were used to examine divergent validity. Cross loading involves the notion that standardized loadings of specific latent factors assessed across various items will have higher values on that specific factor compared to the standardized loading values of other factors. This helps the researchers to determine whether an item's relationship to a particular latent factor is stronger than that of any other factor. Table 5 presents the results.

	Item Code	**Factor loadings**	**Factors / Loadings**												
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Task characteristics (1)	task_char1	0.774	**.397**	.218	.103	.211	.176	.141	.014	.048	.261	.090	.046	.088	.018
	task_char2	0.649	**.499**	.206	.211	.008	.093	.254	.161	.036	.127	.012	.115	.172	.046
	task_char3	0.547	**.410**	.040	.151	.104	.025	.110	.086	.152	.106	.237	.086	.140	.207
Technology characteristics (2)	tech_char1	0.767	.177	**.477**	.313	.104	.282	.320	.176	.266	.152	.197	.230	.209	.332
	tech_char2	0.796	.137	**.425**	.103	.052	.158	.068	.142	.136	.287	.137	.180	.115	.172
	tech_char3	0.559	.125	**.354**	.238	.157	.174	.287	.016	.109	.152	.252	.127	.081	.216
Individual	indi_char1	0.720	.14	.22	**.47**	.36	.26	.31	.18	.29	.18	.18	.20	.18	.26

characteristics (3)			6	3	**4**	7	1	1	8	2	2	9	0	3	8
	indi_char2	0.765	.134	.323	**.431**	.036	.113	.081	.099	.070	.211	.094	.156	.035	.110
	indi_char3	0.559	.162	.301	**.339**	.176	.178	.261	.028	.167	.132	.255	.108	.159	.168
Task technology fit (4)	task_tech_fit1	0.699	.209	.175	.275	**.352**	.140	.181	.100	.247	.132	.260	.078	.102	.181
	task_tech_fit2	0.976	.240	.604	.500	**.481**	.141	.162	.110	.227	.320	.268	.183	.231	.245
	task_tech_fit3	0.591	.261	.223	.249	**.415**	.255	.148	.214	.172	.042	.167	.274	.124	.073
Performance expectancy (5)	perf_expec1	0.836	.222	.317	.365	.313	**.531**	.383	.372	.332	.249	.221	.118	.258	.081
	perf_expec2	0.686	.081	.177	.164	.194	**.290**	.016	.074	.004	.231	.205	.038	.020	.141
	perf_expec3	0.769	.129	.097	.141	.185	**.309**	.083	.108	.157	.151	.143	.224	.081	.037
	perf_expec4	0.711	.059	.208	.149	.021	**.278**	.104	.143	.112	.138	.119	.128	.158	.082
Effort expectancy (6)	effort_expec1	0.723	.367	.098	.039	.059	.057	**.356**	.011	.015	.163	.212	.046	.043	.076
	effort_expec2	0.847	.135	.267	.436	.185	.427	**.421**	.226	.297	.285	.141	.372	.299	.096
	effort_expec3	0.673	.035	.152	.211	.278	.204	**.414**	.123	.130	.090	.306	.271	.183	.262
Social influences (7)	soci_influ1	0.682	.083	.102	.059	.239	.030	.067	**.427**	.102	.014	.050	.063	.050	.081
	soci_influ2	0.683	.228	.288	.257	.159	.254	.484	**.375**	.315	.109	.147	.234	.247	.120
	soci_influ3	0.651	.027	.099	.032	.183	.249	.046	**.524**	.191	.116	.053	.202	.273	.015

Facilitating conditions (8)	facili_cond1	0.800	.049	.182	.216	.118	.253	.155	.270	**.412**	.077	.002	.186	.212	.118
	facili_cond2	0.690	.050	.037	.003	.283	.262	.125	.018	**.353**	.223	.259	.108	.147	.210
	facili_cond3	0.753	.143	.270	.273	.256	.120	.240	.236	**.478**	.114	.267	.202	.219	.010
Perceived Trust (9)	perci_trus1	0.800	.176	.252	.232	.064	.006	.232	.185	.225	**.367**	.118	.171	.161	.003
	perci_teust2	0.893	.025	.242	.181	.236	.258	.212	.012	.292	**.351**	.221	.238	.131	.128
	perci_trust3	0.878	.051	.049	.038	.170	.158	.009	.249	.208	**.385**	.142	.163	.163	.116
Perceived autonomy (10)	perci_auton1	0.565	.141	.017	.004	.093	.059	.134	.110	.055	.108	**.482**	.058	.158	.037
	perci_auton2	0.697	.033	.044	.047	.044	.211	.165	.047	.292	.160	**.321**	.190	.184	.194
	perci_auton3	0.751	.064	.225	.296	.028	.003	.059	.154	.166	.058	**.336**	.004	.016	.082
	perci_auton4	0.716	.050	.037	.038	.141	.052	.282	.206	.187	.265	**.381**	.059	.277	.216
Continuance intention (11)	cont_inten1	0.885	.091	.140	.163	.144	.063	.236	.118	.174	.098	.170	**.351**	.114	.311
	cont_inten2	0.925	.284	.174	.146	.051	.186	.133	.290	.166	.269	.200	**.348**	.008	.036
	cont_inten3	0.846	.009	.141	.207	.270	.038	.020	.070	.015	.088	.341	**.038**	.055	.263
Management support (12)	manag_supp1	0.949	.168	.295	.326	.031	.016	.169	.303	.082	.076	.192	.217	**.396**	.048
	manag_supp2	0.857	.008	.129	.201	.087	.136	.275	.005	.116	.083	.103	.025	**.381**	.138
	manag_s	0.5	.0	.2	.2	.1	.2	.2	.2	.2	.0	.2	.0	**.3**	.2

	upp3	78	33	28	30	72	43	33	47	00	47	77	96	**87**	10
Computer self-efficacy (13)	compu_self_effi1	0.905	.148	.225	.251	.275	.173	.170	.027	.003	.080	.319	.267	.155	**.401**
	compu_self_effi2	0.642	.021	.034	.009	.046	.058	.195	.030	.125	.032	.023	.113	.042	**.406**
	compu_self_effi3	0.704	.065	.076	.035	.125	.230	.066	.136	.221	.158	.069	.075	.193	**.384**

Table 5: Cross LoadingsFactor

Discriminant Validity

The discriminant validity (inter correlations) results for all factors involved in this study are presented in Table 6. This type of validity is predicated on the assumption that the factor correlates to an acceptable minimum level. It is essential to compare the correlation values to the value of 0.700 in order to establish whether the discriminant validity had been achieved (0.700). This indicator assumes that all inter-correlations must be below the given value. The inter-correlation values are clearly found to be below the criterion, and thus the discriminant validity (using this criterion) value was reached.

Factors	**Factors**												
	1	2	3	4	5	6	7	8	9	10	11	12	1
1. Task	1												
2.	.36	1											
3.	.35	.64	1										
4. Task.	.24	.49	.46	1									
5.	.19	.50	.44	.45	1								
6. Effort	.38	.54	.52	.43	.49	1							
7. Social	.19	.25	.21	.45	.40	.30	1						
8.	.12	.42	.42	.55	.53	.44	.45	1					
9.	.22	.49	.42	.42	.46	.39	.38	.65	1				
10.	.25	.47	.42	.59	.62	.55	.30	.43	.43	1			
11.	.18	.44	.37	.42	.46	.51	.44	.58	.52	.65	1		
12.	.30	.33	.30	.39	.40	.44	.55	.49	.41	.48	.52	1	
13.	.20	.28	.25	.30	.38	.36	.16	.28	.22	.35	.39	.32	1

Table 6: Intercorrelation between Research Factors

Descriptive Analysis of the Research Factors

In order to describe the opinions (rates) given by the participants for each factor. The findings are presented in Tables 7 and 8. Table 7 summarizes the descriptive statistics for 41 questionnaire statements based on a sample of 187 participants. The table shows that the mean scores for all statements range from 3.10 (statement 22: soci_influ3) to 4.50 (statement 1: task_char1 and statement 3: task_char3). This suggests that overall, participants tended to agree

somewhat with the statements.

No.	Items / Questions	n	Mean	SD	Skewness
1	task_char1	187	4.50	0.56	-.562
2	task_char2	187	4.33	0.71	-1.667
3	task_char3	187	4.50	0.58	-.676
4	tech_char1	187	3.84	0.91	-1.160
5	tech_char2	187	4.04	0.79	-.874
6	tech_char3	187	4.20	0.69	-1.456
7	indi_char1	187	3.93	0.86	-1.094
8	indi_char2	187	4.07	0.77	-.710
9	indi_char3	187	4.28	0.61	-.819
10	task_tech_fit1	187	3.75	0.88	-.566
11	task_tech_fit2	187	3.54	1.02	-.445
12	task_tech_fit3	187	3.35	1.03	-.561
13	perf_expec1	187	3.40	1.09	-.247
14	perf_expec2	187	3.57	1.01	-.753
15	perf_expec3	187	3.30	1.08	-.255
16	perf_expec4	187	3.50	0.97	-.565
17	effort_expec1	187	4.06	0.70	-.468
18	effort_expec2	187	3.96	0.83	-.952
19	effort_expec3	187	4.09	0.81	-.953
20	soci_influ1	187	3.70	0.94	-1.003
21	soci_influ2	187	4.01	0.70	-.596
22	soci_influ3	187	3.10	1.16	-.211
23	facili_cond1	187	3.69	0.93	-.732
24	facili_cond2	187	3.67	0.79	-.652
25	facili_cond3	187	3.63	0.93	-.489
26	perce_trust1	187	3.52	0.96	-.525
27	perce_trust2	187	3.57	0.92	-.716
28	perce_trust3	187	3.42	1.01	-.356
29	perce_auton1	187	4.09	0.63	-.327
30	perce_auton2	187	3.93	0.82	-.926
31	perce_auton3	187	3.71	0.86	-.737
32	perce_auton4	187	3.66	0.97	-.557
33	cont_inten1	187	3.74	0.99	-.731
34	cont_inten2	187	3.49	0.98	-.551
35	cont_inten3	187	3.45	1.08	-.426
36	manag_supp1	187	3.74	0.93	-.860
37	manag_supp2	187	3.87	0.89	-1.117
38	manag_supp3	187	3.69	0.90	-.757
39	compu_self_effi1	187	3.80	0.82	-.523
40	compu_self_effi2	187	4.01	0.83	-.761
41	compu_self_effi3	187	3.96	0.78	-.744

Table 7: Means, Standard Deviations and Item Skewness

No.	Factor	Mean	SD	MI %	Level
1	Task characteristics	4.44	0.47	88.8	High
2	Technology characteristics	4.03	0.65	80.6	High
3	Individual characteristics	4.09	0.60	81.8	High
4	Task technology fit	3.55	0.83	71.0	Moderate
5	Performance expectancy	3.44	0.87	68.8	Moderate
6	Effort expectancy	4.04	0.66	80.8	High
7	Social influences	3.60	0.74	72.0	Moderate
8	Facilitating conditions	3.66	0.75	73.2	Moderate
9	Perceived Trust	3.51	0.87	70.2	Moderate
10	Perceived autonomy	3.84	0.64	76.8	High
11	Continuance intention	3.56	0.94	71.2	Moderate
12	Management support	3.77	0.78	75.4	High
13	Computer self-efficacy	3.92	0.68	78.4	High

Table 8: Means, Standard Deviations, and Importance Index (MI) For all Factors

Means description (1 – 2.33 low, 2.34 – 3.67 medium, 3.68 – 5 high)

Table 8 presents the means, standard deviations, and mean indexes (expressed in percentage) for all of the research factors. The 'task characteristics' variable was found to have the highest mean (4.44), whereas the 'performance expectancy' variable had the lowest mean (3.44).

Hypotheses Testing Results

Before carrying out multiple linear regression to test the research hypotheses, a number of fundamental assumptions were checked, namely the normality of the distribution of the independent variable, and the degree of multi-collinearity between the independent variables. The following table presents the results of these tests.

	Factors	Skewness	Kurtosis	VIF	Tolerance
TTF	Task characteristics	-0.295	-0.997	.868	1.152
	Technology characteristics	-0.686	0.655	.109	9.212
	Individual characteristics	-0.540	0.391	.109	9.172
	Task technology fit	-0.569	-0.266	.364	2.744
UTAUT	Performance expectancy	-0.468	0.131	.352	2.839
	Effort expectancy	-0.500	0.422	.602	1.660
	Social influences	-0.093	-0.321	.594	1.683
	Facilitating conditions	-0.529	0.110	.438	2.282
	Continuance intention	-0.598	-0.105	-	-
	Perceived trust	-0.549	0.334	.528	1.895
	Perceived autonomy	-0.204	0.351	.468	2.139
	Management support	-0.787	0.543	.526	1.901
	Computer self-efficacy	-0.455	0.155	.781	1.280

Table 9: Normality and Co-linearity Between the Independent Variables

Table 9 presents the findings of the normality indicators, namely the skewness and kurtosis (to determine the closeness of the research data to the theoretical normal distribution).

The skewness figures ranged between (-0.204) for perceived autonomy and (-0.787) for management support. These values are deemed close to the normal distribution since the acceptable range (in most studies) varies between (-3 and 3). Kurtosis is the second sign of normality in data. Kurtosis describes the peak of the curve, albeit high, low, sharp, or flat. The desirable values exhibited by the normal data distribution curve were around (<7). The findings presented in the table show that the maximum obtained value was (0.997. However, this is less than the desired value. Nonetheless, it can still be concluded that the data is normally distributed.

Another important test that should be carried out before performing multiple linear regression is the VIF test, which aims to examine multi-collinearity. It is evident in this study that three values were less than (10), which indicates that there was a low level of collinearity between the independent variables used to predict the dependent variable. If VIF value is found to be higher than 30, this indicates a significant multicollinearity issue in the data, whilst a VIF value higher than 10 indicates that the coefficients are untrustworthy. Meanwhile, a VIF between 5-10 indicates a moderate problem, and a VIF value below 5 indicates a very small problem. Similarly, a VIF test can be used to test tolerance. This is considered the reciprocal of the VIF. Tolerance may indicate that results are good if the values are found to be > 0.05. All of the values discussed above met this criterion, indicating that there were no multi-collinearity issues within the data. After the conditions have been met, the linear regressions are deemed appropriate.

Testing Hypotheses 1, 2 and 3

Multiple linear regression was carried out to test hypotheses 1, 2, and 3 and the results are presented in the table below.

Factors	**Regression indicators**				**Coefficients**			
	R^2	**Adjusted R^2**	**F**	**Sig (p)**	**B**	**SE**	**T**	**Sig(t)**
Individual characteristics	0.254	0.242	20.77	0.000	0.266	0.055	4.84	0.000
Task characteristics					0.318	0.12	2.65	0.009
Technology characteristics					0.646	0.046	14.04	0.000

Table 10: Multiple Linear Regression for Testing Hypotheses 1 -3

In Table 10, the multiple linear regression results for hypotheses 1-3 are presented. The f-value of the model was revealed 20.777. This is considered statistically significant because the corresponding p-value (0.000) was statistically significant (< 0.05). The determination coefficient (R^2) expresses the percentage of variability in the dependent variable based on the independent variables used to predict it. The R^2 value was 25.4 %. Regarding T values, it is clearly shown that all T-values in the table are statistically significant (Sig (t) = 0.000), proving all factors (individual, task, and technology characteristics) have a significant effect on the dependent variable (Task-Technology Fit) in the model. It is also revealed that changes in technology characteristics have the strongest influence on Task-Technology Fit.

Hypotheses 4 - 12

Multiple linear regression was also carried out to test the hypotheses. The findings are presented

in the following table.

Factors					Coefficients			
	R^2	**Adjusted R^2**	**F**	**Sig (p)**	**B**	**SE**	**T**	**Sig (t)**
Task technology fit	0.840	0.706	0.691	47.195	0.000	.076	3.130	0.002
Performance expectation					.382	.074	5.154	0.000
Effort expectation					.327	.075	4.346	0.000
Social influences					.214	.068	3.174	0.002
Facilitating conditions					.387	.077	5.014	0.000
Perceived trust					.278	.060	4.610	0.000
Perceived autonomy					.227	.088	2.588	0.010
Management support					.165	.068	2.434	0.016
Computer self-efficacy					.359	.064	5.619	0.000

Table 11: Multiple Linear Regression for Testing Hypotheses 4-12

The findings of the multi-linear regression tests performed on hypotheses 4-12 are presented in Table 11. The model's f value was found to be 47.2, which was significant as the corresponding p-value (0.000) was statistically significant (< 0.05). The coefficient of determination R^2 is used to highlight the percentage of variability in the dependent variables when the independent variables are used to predict them. The results indicated that the R^2 value was (84.0 %).

Hypothesis	Independent	Dependent	Impact	P - value	Result
H1	Individual characteristics --->	Task technology fit	0.266	0.000	Supported
H2	Task characteristics --->		0.318	0.009	Supported
H3	Technology characteristics --->		0.646	0.000	Supported
H4	Task technology fit --->	Continuance intention	.239	0.002	Supported
H5	Performance expectancy --->		.382	0.000	Supported
H6	Effort expectation --->		.327	0.000	Supported
H7	Social influences --->		.214	0.002	Supported
H8	Facilitating conditions --->		.387	0.000	Supported
H9	Perceived trust --->		.278	0.000	Supported
H10	Perceived autonomy --->		.227	0.010	Supported
H11	Management support ---		.165	0.016	Supported

	>				
H12	Computer self-efficacy -->		.359	0.000	Supported

Table 12: Summary of the Hypotheses Testing Results

Discussion and Conclusion

This study has successfully integrated TTF (Goodhue and Thompson, 1995) with UTAUT (Venkatesh et al., 2003) and extended them with the inclusion of four other drivers (Performance Expectancy, Computer Self-Efficacy, Perceived Trust, and Perceived Autonomy) to gain better understanding of the continuance intention to use e-learning systems. It is noticeably found that the majority of factors fall within the "high" or "moderate" categories based on the means (ranging from 3.44 to 4.44). This suggests generally positive scores for most factors, indicating a potential positive bias or a focus on aspects perceived favourably.

The main strength point of the current model lies in its potentiality in addressing technological, individual and job-related aspects (Park et al., 2009). Based on the model fit indices, the integrated model shows itself to be a powerful instrument to explain the continuance intention to use e-learning systems. The empirical testing of the extended TTF-UTAUT found that some factors are worthy to be considered before making decision to use or to continue use the existing e-learning system. Consequently, the extended TTF-UTAUT contributes to a better understanding of the drivers that lead to determining the extent of the continuance intention to use e-learning system.

It was found that when users perceive a fit between individual characteristics, task characteristics and technology characteristics, they would continue use the current system. It was also noticed that all exogenous factors; Perceived Autonomy, Management Support, Computer Self-Efficacy and Perceived Trust have direct and significant impact on the continuance intention.

The application of the proposed model to the e-learning system outlined in the present paper increases our understanding of the technological, organizational, and individual mechanisms as they relate to better acceptance of using e-learning.

Contribution to Knowledge

Because investigating the technology acceptance may vary in diverse cultural contexts, the impact of individual aspects on technology adoption and usage needs more attention. Thus, the existing study incorporates "perceived autonomy", "management support", "computer self-efficacy" and "perceived trust" with the two well-established research models; UTAUT and TTF in an attempt to reach a better understanding of their impact on forming users' perceptions of the continuance intention to use e-learning systems. The proposed model helps researchers achieve a better understanding of why scholars choose to use e-learning systems to complete learning tasks. In building and testing the hypothetical links in the proposed model, this study contributes to the literature by showing their significance to the continuance intention to use e-learning systems. Thus, to advance the continuance intention to use e-learning systems between university scholars, it should be noticed that UTAUT and TTF are effective in predicting the continuance intention. Meanwhile, we should attach great importance to perceived trust, autonomy, management support, and computer self-efficacy (Almaiah et al., 2019, Alharbi, 2017, Jaradat et al., 2020).

Contribution to Practice

In practice, system developers need to be aware that sustainable usage requires developing a system that is more customized to the specific requirements of the task being done. To ensure successful use, members of e-learning centers should be aware that proceeding with the current e-learning system is determined also by providing management support, fostering scholars' confidence in their abilities to use such systems competently, and offering the conditions that facilitate convenient use of the e-learning system. They must also perceive autonomy and trust while using such new technology. Additionally, it is important to note that scholars' perceptions are affected by the attitudes of others towards using the current system. Likewise, university scholars have to perceive its usefulness, convenience, and easiness.

Such understanding is especially important to electronic learning system tool developers; their grasp of how individual characteristics fit with task characteristics lead to user choices to employ the tool or not. As aforementioned, a better understanding of how individual learners learn best can facilitate the creation of flexible learning environments, leading towards more uniform learning outcomes.

Limitations and Recommendations for Future Research

One limitation arises from the means of selecting respondents, which lacked randomness. Furthermore, it is hoped that this study will stimulate further research to examine the existing model in other contexts or extend it by incorporating other factors.

Acknowledgement

"I extend my sincere thanks and appreciation to Al al-Bayt University for their generous financial support of this research. This support has played a significant role in enabling the preparation and publication of this scientific research. We deeply appreciate the university's efforts in supporting scientific research."

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