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A Unified Framework for E-Learning Continuity: Integrating Task-Technology Fit, Unified Theory of Acceptance and Use of Technology, and External Facilitators

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ABSTRACT

The study forms a combined theoretical model to review the predictors of the e-learning continuance intention in higher education. The synthesis of the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Task-Technology Fit (TTF) model with the Management Support, Computer Self-Efficacy, Perceived Trust, and Perceived Autonomy provides a complete picture of the system persistence. Data were gathered through an electronic questionnaire that was given to the faculty members in both the public and the private universities in Jordan following a deductive, quantitative approach. The analysis of 220 valid responses shows that the main cause of Task-Technology Fit is the characteristics of technology, which in turn leads to the continuance intention. Moreover, the performance expectancy and facilitating conditions became the prevailing UTAUT constructs, whereas computer self-efficacy turned out to be the most powerful exogenous variable. This research not only adds to the body of knowledge a multidimensional model that is unique but also offers university administrators and system developers strategic wisdom to improve e-learning sustainability.

Keywords: UTAUT, TTF, E-Learning, Management support, Computer self-efficacy, Trust, Autonomy
JEL Classifications: I21, O33, M15

1. INTRODUCTION

E-learning systems have become an integral part of contemporary pedagogy as a result of the digital transformation of higher education. Nevertheless, although the preliminary acceptance of these technologies has been widely reported, the causes of continuance intention or sustained use among faculty members are not well comprehended particularly in developing nations. Studies indicate that the one-size-fits-all approach to technology adoption is not a proper one because cultural and socio-economic differences between developed and developing countries fundamentally change the perception and interaction of digital tools by their users (Valencia-Arias et al., 2019).

Past research has incorporated theoretical frameworks like the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Task-Technology Fit (TTF) model to explain the point of intersection of user intention and functional utility (Tarhini et al., 2016; Wan et al., 2020; Oliveira et al., 2014). However, such models tend to ignore the organizational and psychological complexities that determine professional scholars. In line with the suggestion that existing theories should be broadened as advanced by Venkatesh et al. (2011), this paper proposes a combined model that integrates Management Support, Computer Self-Efficacy, Perceived Trust, and Perceived Autonomy. With the incorporation of these exogenous variables, the research will help present a stronger predictive model to technology persistence.

Specific to Jordan (and most developing countries), the transition to e-learning is fraught with institutional peculiarities that are not usually considered in the literature on the West (Tarhini et al., 2016). This is the gap that is addressed by this study through the use of Jordan as a critical case study. Through the evaluation of the views of university professors in the public and the private sector, the study can establish the key factors that drive their dedication to e-learning, which can be used as a comprehensive model to academic institutions aiming to guarantee the sustainability of their digital infrastructure.

2. THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

2.1. Task-Technology-Fit (TTF)

Task-Technology-Fit (TTF) model is a model developed by Goodhue and Thompson (1995) and it concentrates on the congruent factors that influence successful use of information systems. This framework shows the particular difficulties faced by the users when technology is used to perform professional tasks, implying that performance is not an outcome of using a system, but the effectiveness with which the system aids in accomplishing the task at hand. TTF is used in the context of e-learning to describe the system ability to accommodate instructors in a wide variety of pedagogical tasks. To be a good information technology manager, one must be able to bring about an optimal fit between technology, user and task at hand. This requires a very high level of fit wherein the user has sufficient knowledge and motivation and the technology itself has the ability and performance needed to accomplish the task. Moreover, users should be well trained to close any gaps in application. Since lack of proper fit between these components may lead to serious implementation problems throughout a project lifecycle, as Ammenwerth et al. (2006) highlighted, may cause serious implementation problems.

The theory was firstly introduced by Goodhue and Thompson (1995) to show that the correspondence between the features of technology and the work of the users directly influences the individual performance. Three fundamental antecedents, including individual, task, and technology characteristics, determine this quality of fit. Ammenwerth et al. (2006) further explained this by saying that the general fit is dependent on certain attributes at any given level. At an individual level, it will encompass motivation and interest of the user in the task, IT expertise, flexibility of the user to new working processes, and organizational environment, including team culture and teamwork. Meanwhile, task-level attributes are concerned with the complexity and structure of the activities being undertaken and the interdependence of activities. Lastly, technology-level features include the reliability, usability, as well as functionality of hardware and software tools. All these together constitute a basis of how much a user would consider a system to be suitable to its intended use.

2.2. Individual Characteristics (Ind-Ch)

Acceptance of technology is not a by-product of system design and much depends on the personal skill set, expertise of the user (Goodhue and Thompson, 1995). The TTF framework looks at the impact of personal characteristics of an individual such as demographic, physiological and cognitive differences on their perception of whether a system suits their professional needs. The psychological propensity of the user to digital adoption, as well as his or her past experience with using technical platforms, serve as the critical predictors of the willingness to use a system. It is continually observed that users who have greater technical experience tend to embrace new systems (Lee et al., 2011). Such features in the e-learning sector define the perception of the faculty members on the utility of the system and thus affect the overall compatibility of the digital environment with their instructional objectives.

2.3. Task Characteristics (Task-Ch)

The task is a very general definition in the sense that it refers to a series of actions an individual carries out in order to change the inputs to certain outputs (Goodhue and Thompson, 1995). In the academic world, the activities of instructors are very diverse, and they include communicating with students, distributing course materials, and managing interactive assessments. The body of research in different fields has found the task characteristics as one of the key antecedents of perceived TTF (Tam and Oliveira, 2016). The researchers in this research assume that the perceived sufficiency of an e-learning system is directly predetermined by the peculiarities of the teaching activity, including the necessity of real-time feedback and access to resources. According to Oliveira et al. (2014), professionals tend to embrace a technology when they feel that there is a high correspondence between the functions of the tool and their daily business needs, which eventually has an overall positive effect on job performance.

2.4. Technology Characteristics (Tech-Ch)

In the Task-Technology-Fit model, the technology characteristics are identified as the definite characteristics, abilities, and design features of the tools that people use to perform their professional duties. These features in the e-learning environment in the context of higher education are known as the functional architecture of the e-learning environment such as student-teacher communication features, digital quiz administration features, and the smooth flow of instructional content. It has been long held in scholarly literature that technical reliability and perceived complexity of any information system is critical to its successful implementation. According to Venkatesh et al. (2016), some of the technological features like stability of the system and ease of navigation are key predictors of whether a platform will be effectively implemented in an organization. With a technical instability or an overly steep learning curve, the usefulness of an e-learning system becomes low, despite the theoretical pedagogical advantages.

The TTF model reveals that technologies are basically considered to be the tools that people use to accomplish whatever is assigned to them. The technological features of an e-learning program can greatly contribute to the overall learning experience and academic success of the scholars in case the technological characteristics are adjusted to the needs of the faculty, in particular (Wan et al., 2020). Nevertheless, the connection between the technology and the user lies deeply in the perception, in case the scholars discover that the system does not have the features needed or is too cumbersome to fulfill its intended purpose, they tend to feel a professional frustration. This unsatisfaction is what causes a disconnect that does not allow attaining a fit, which, in turn, negates the desire of the user to keep using the system in the long term. Thus, the complexity and availability of the technology are the main points of the advocacy of digital pedagogy by the user. Consequently, these subsequent hypotheses were developed:

- H_1: Professional and personal Individual Characteristics of the user significantly improve the Task-Technology Fit
- H_2: The differences in Task Characteristics lead to the significant differences in Perceived Task-Technology Fit
- H_3: The Task-Technology Fit depends significantly on the functional Technology Characteristics of e-learning system
- H_4: The greater the levels of the Task-Technology Fit, the greater the Continuance Intention to use e-learning technology.

2.5. Unified Theory of Acceptance and Use of Technology (UTAUT).

Unified Theory of Acceptance and Use of Technology (UTAUT) has become an indispensable part of the information systems research because it examines the reasons why people adopt or refuse adopting new technologies. This model was developed by Venkatesh et al. (2003) through the synthesis of the key constructs of major social theories, one of them being the seminal Technology Acceptance Model (TAM) which was proposed by Davis (1989). According to the UTAUT framework, four major pillars, namely, performance expectancy (Per-Exp), effort expectancy (Eff-Exp), social influence (Soc-Inf), and facilitating conditions (Fac-Con), are considered to be the main drivers of technology adoption. In the context of e-learning in particular, researchers have applied this model in order to unravel the intricate motivations of e-learning users in the context of higher education. A study conducted by Yakubu and Dasuki (2019) to identify the determinants of pedagogical tool adoption proved that the intention to work with a system is mainly motivated by the perceived utility and convenience of the system, but the transition to the real world is determined by the supply of structural support. Similarly, Hanif et al. (2018) have shown that the perception of value of a platform by a student is improved by social pressures, the level of institutional control, and the lack of difficulty in using the technology. Furthermore, Farooq et al. (2023) affirmed that the effectiveness of the combination of functional advantages, usability, and environmental support interventions is a determining factor in the integration of electronic systems into the academic workflow by the professionals.

2.6. Performance Expectancy (Perf-Exp)

Performance Expectancy (Perf-Exp) can be considered the most powerful among these constructs as Venkatesh et al. (2003) defined it as the extent to which an individual holds the view that the application of a particular system will help him or her achieve meaningful gains in job performance. E-learning platforms are considered to be precious resources in a scholarly setting since they allow teachers to fulfill various learning tasks instantly or develop their general pedagogical skills and professional effectiveness. Instructors will be more committed to the use of a digital tool when they believe that the tool has increased their instructional effectiveness or enabled them to better cope with their workload. This high positive relationship between performance expectancy and usage intention is in line with the initial UTAUT propositions and later empirical evidence in the e-learning domain (Wang et al., 2009; Khechine et al., 2014; Wong and Huang, 2011). This study will therefore assume that, the perceived utility of the system is a pre-requisite to continued use hence the following hypothesis:

- H_5: The perceived performance expectancy of a system significantly elevates a user's continuance intention to utilize e-learning platforms.

2.7. Effort Expectancy (Eff-Exp)

Effort Expectancy (Eff-Exp) is one of the primary constructs of the UTAUT, as it has been conceptually developed based on the element of the Technology Acceptance Model (TAM) of perceived ease of use (Davis, 1989). Venkatesh et al. (2003) explain that this variable is the level of comfort relating to the use of a particular information system. Effort Expectancy in the area of expertise named educational technology can be defined as the perceived ease and user-friendliness of e-learning platform. Ample empirical data has proven that when a system is seen as easy to use and needs little mental effort, users will accept it much better. This has been proved to be a strong predictor of both behavioral intention and actual use of technology in different institutional contexts (Jaradat et al., 2020). Effort Expectancy is especially significant at the very beginning of the technological implementation process, when a steep learning curve might become a serious obstacle to entry. To the academic scholars, who in most cases have to handle heavy workloads, an e-learning system has to be accessible and easy to navigate to be viewed as a viable tool to use in everyday instruction. When the perceived burden of the system is too heavy or perceived to be too complex, the perceived burden is likely to supersede the perceived benefits, resulting in a decrease in user engagement. On the other hand, a smooth user experience results in a good attitude towards the system, which affects the long-term commitment of the user directly. This study hypothesizes that Effort Expectancy is an important predictor of behavioral intentions in faculty since it has been established that ease of use is a key psychological factor in the adoption process. It is on this theoretical basis that the following hypothesis is made:

- H_6: Higher levels of effort expectancy, characterized by ease of use, result in a significant increase in the continuance intention toward e-learning tools.

2.8. Social Influence (Soc-Inf)

As defined by Venkatesh et al. (2003), Social Influence (Soc-Inf) refers to how much an individual believes that important other people, who may be a peer, superiors, or the organization at large, feel that they should use a new information system. This construct is based on the fact that the adoption of technology is not an isolated activity but a social phenomenon that is subject to the bias of the views and anticipations of the professional group. In the academic context, the choice to keep on using an e-learning platform is usually influenced by the digital culture that is currently exhibited by the university and the extent of support given by colleagues and university leadership. Past studies have repeatedly shown that Social Influence is a major factor that enhances the intention of a user to use innovative technology (Abbad, 2021; Wang et al., 2009; Tan, 2013). Social pressure and peer approval is an influential factor in institutions of higher learning, where teamwork in teaching and research may require the utilization of popular online platforms. It has been observed by scholars like Ifinedo (2007), Dai et al. (2023), Venkatesh and Bala, (2008), and Wong and Huang (2011) that faculty members tend to believe that a system employed by their colleagues is a common norm towards achieving professional success. This conformity to the social rules assists in diminishing the level of uncertainty and constructing trust in the system worth. Based on the previous empirical investigations, and the principles of the UTAUT model (Venkatesh et al., 2011; Venkatesh et al, 2000), it is clear that the Social Influence is a major contributing factor to the continuance of the usage of technology. Thus, the hypothesis to test this relationship in the Jordanian context was formulated as follows:

- H_7: A user's continuance intention is significantly shaped by the prevailing social influence and professional norms within their academic environment.

2.9. Facilitating Conditions (Fac-Con)

Facilitating Conditions (Fac-Con) are the extent to which one is of the opinion that there is a strong organizational and technical infrastructure in place to facilitate the usage of a system (Venkatesh et al., 2003). These conditions in the particular scenario of e-learning include a large number of support mechanisms such as having high speed internet, up to date IT hardware, extensive training programs, as well as access to technical support personnel. These environmental factors are critical in acceptance and sustained use of information systems because, without a favorable infrastructure, even the most technologically advanced users might find it difficult to continue using them regularly. In the case of university professors, the presence of these external resources is usually a pre-condition to the effective implementation of digital tools in their curriculum. Here the central role is that of the organization since it is the universities that need to offer the physical resources and institutional knowledge required by faculty to overcome technical barriers. In the event of glitches or system failures, having receptive IT support technicians will be the key to causing a slight delay or complete abandonment of the platform. Moreover, the perceived accessibility of continuous training makes the scholars competent since the technology is changing. When the infrastructure is seen to be inadequate or unreliable, it forms a facilitating gap which impedes the user to use the system in an effective way, whether the user is motivated to use the system or not. Since the institutional environment is the baseline on which all other adoption factors are constructed, the effect of the institutional environment on long-term usage is critical to be examined. Based on this, the hypothesis was set as follows:

- H_8: The availability of robust Facilitating Conditions significantly strengthens the Continuance Intention to remain engaged with e-learning systems.

2.10. Management Support (Mgt-Sup)

Management Support (Mgt-Sup) is the promotion and encouragement of an organizational leadership. In a professional setting, the governing body is one of the key founders of institutional values and views, which, in turn, defines the behavior of employees (El-Masri and Tarhini, 2017). In the context of the incorporation of digital systems, the dedication of top management is an evident requirement to the successful implementation of innovation and the subsequent intentions on technical adoption (Davis et al., 1989). The support of the leadership guarantees that the staff is more aware of the value of a platform, which further enhances their desire to use it; in contrast, the absence of institutional support acts as an obstacle to technological use (Alqahtani and Rajkhan, 2020; Ragu-Nathan et al., 2008). This means that when a teacher receives management support regarding the use of e-learning, his or her attitude towards the same will be greatly impacted. Resting on these observations the hypothesis was formulated as follows:

- H_9: Stronger management support significantly contributes to a scholar's sustained Continuance Intention to adopt digital teaching tools.

2.11. Computer Self-efficacy (Com-Eff)

Self-efficacy concept was firstly identified by Bandura (1986) and Marakas et al. (1998) as the subjective beliefs in the ability of an individual to perform the particular behaviors needed to achieve the particular attainments. Computer Self-Efficacy (Com-Eff) in a specialized context of information systems is not just a reflection of a set of separate component skills, but a broader understanding of the ability of a user to coordinate those skills to meet a complex task with the help of a computer (Katsarou, 2021). In the case of faculty at a university it would be one thing to have the technical know-how and quite another to have the professional confidence to handle a full-sized virtual classroom or even to troubleshoot digital exams in real-time. Empirical studies have continuously highlighted how self-efficacy has a significant impact on the overall technology adoption scenario (Okuonghae et al., 2022). Researchers have pointed out that highly computer self-efficacious people tend to perceive technology as an opportunity to be conquered but not as a risk that should be avoided. More so, more recent results by Sendogdu and Koyuncuoglu (2022) underscore that these internal perceptions are key predictors of computing behaviors, which in essence serve as a psychological gateway to system engagement. In e-learning settings, a technically competent professor will take more chances and will persevere in the presence of technical challenges. On the other hand, low self-efficacy may cause technology anxiety that severely impedes the intention to continue using the system. As this internal confidence is the precondition to long-term digital pedagogy, the following statement was hypothesized:

- H_{10}: The Continuance Intention to use e-learning technology is significantly contingent upon an individual's level of Computer Self-Efficacy.

2.12. Perceived Trust (Per-T)

With the growing prominence of digital environments in the fundamental operations of higher education, the study of the place of trust in technology has grown quickly. It has been noted that trust is one of the key elements of adopting various technological advances, including cloud computing and internet banking, as well as sophisticated e-learning ecosystems (Jaradat et al., 2020; Almaiah et al., 2019; Alharbi, 2017). Trust in such academic settings is normally associated with the psychological disposition of the user to the security, reliability, and integrity of such a system. To invest in an e-learning system, teachers need to have confidence that the system will safeguard confidential student information, have a high uptime, and properly document student academic achievement. According to the literature review, in order to ensure high intention to use a new technology, providers need to assure that the system is of high quality of service when implemented in a safe and efficient way. Trust serves as a risk-reduction factor; once the users believe that the technology is reliable, they will be less resistant to adoption. Quite on the contrary, a distrust or a sense of vulnerability may cause major resistance within the institution and unwillingness to use digital resources to complete tasks that have high stakes (Alharbi, 2017). Within the e-learning environment, faculty members who are uncertain as to the reliability or confidentiality of the platform will not be convinced to make a long-term commitment to using the platform. Thus, the basis on perceived trust is necessary in the shift between 1st-time adoption and long-term integration. As a result, the statement that was suggested was as follows:

- H_{11}: A significant positive relationship exists between Perceived Trust in the system and a user's long-term Continuance Intention.

2.13. Perceived Autonomy (Per-Aut)

Scholars provide a wide definition of perceived autonomy as the feeling of liberty of choice and possibility to live a self-determined life whereby the actions are initiated by their own will (Lakhal et al., 2013; Giesbrecht et al., 2012; Wheatley, 2017). This idea is closely connected to the Self-Determination Theory (SDT) according to which people are the most engaged, motivated, and productive when they believe that they can exert some significant control over their workplace (Deci and Ryan, 2012). Academic freedom in the education sector is based on autonomy; teachers are pleased to be able to design their courses and engage with students in a way that reflects their own philosophy of teaching. In the framework of e-learning, perceived autonomy will also play a crucial role in defining the way faculty members become aware of digital tools (Lenkaitis, 2020). In case a system is perceived as a strict form of imposition that restrains the pedagogical style of an instructor, it can be treated with aversion. Nevertheless, when the platform is regarded as a versatile instrument that allows the educator to structure his or her educational process in a more efficient way, it leads to a greater degree of ownership and devotion. Studies indicate that once the professor is convinced that he or she is able to make personal choices about how and when to use the e-learning features, the interest of the professor to proceed using the system grows enormously. This agency is essential to making sure that e-learning is not perceived as a liability but rather an extension of the professional identity of the educator. Therefore, the hypothesis was as follows:

- H_{12}: The degree of perceived autonomy experienced by an educator significantly dictates their overall continuance intention to utilize e-learning systems.

2.14. Integrated Model of TTF and UTAUT

The Task-Technology Fit (TTF) model and the Unified Theory of Acceptance and Use of Technology (UTAUT) provide a different but complementary view of information system adoption. Whereas, TTF concentrates on the compatibility of requirement of a task with system capacity (Goodhue and Thompson, 1995), UTAUT centers on the behavioral and social motivation of user intent (Venkatesh et al., 2003). Since both models emphasize certain aspects of the user experience, there can be no generalization of either of the models in all possible technological situations. Researchers, therefore, suggest the synthesis of these two frameworks in order to enjoy the strength of each and reduce the weakness of each one. Integration of TTF and UTAUT would offer a more comprehensive picture of the multidimensional aspects of what drives intention to adopt and persist with the use of complex systems. The integrated approach is especially useful since it helps to fill the gaps related to theory that can be detected in isolated models. To illustrate, the TTF model tends to ignore important environmental and organizational variables, including Social Influence and Facilitating Conditions, which are core to the UTAUT model. On the other hand, UTAUT could not consider the technical "fit" needed in particular professional activities. Moreover, both models do not traditionally include particular psychological variables, such as Perceived Trust and Perceived Autonomy, that are imperative to comprehend professional persistence in digital settings. The proposed research model can be used as a more powerful predictive instrument to study e-learning continuance intention because it links these constructs. Applying Management Support, Computer Self-Efficacy, and other important variables to these theoretical frameworks in the particular case of Jordan, overcomes the drawbacks of the previous theories and offers a holistic framework to higher education institutions. Figure 1 demonstrates the research framework and its hypothesis.

3. METHODS AND DATA

3.1. Data Collection

A survey was done to find information about academic employees of private and public universities in Jordan. The questionnaires were sent out via email and other electronics. Out of the total submissions, 12 were eliminated on the basis of invalidity and 220 responses were included in the quantitative analysis. In order to preserve ethical considerations, no personal identifiers were recorded, and all the data were handled in the strictest confidence. The questionnaire was divided into two parts, the first part involved demographic and professional information (e.g., gender, age, type of university), and the second part was a question about the perceptions of the variables in the model by the participants.

3.2. Respondents' Profile

Table 1 provides the demographic and professional profile of the sample. The participants included 188 men (85.8%) and 32 women (14.5%). On the issue of age, 37.3 percent of the respondents fell within the age bracket of 40-49 years. Only a small majority (55.9%, n=123) worked in public universities, and the majority of the respondents indicated an experience between 10 and 15 years of teaching. More so, 73% of the sample was employed in the academic departments of humanities.

4. RESEARCH RESULTS

4.1. Model Fit

Confirmatory analysis was done through the use of five indices to model fit. Chi-square test has the value of 1218.43 ($P < 0.001$) which shows that the proposed model and the data have a statistically significant difference. Nonetheless, the chi-square to degrees of freedom ratio was 3.237 and this is not outside the acceptable range. The CFI (0.921), GPI (0.898), and RMSEA (0.065) values also provided further support of an adequate model fit, as they were in agreement with the critical values. The findings, as shown in Table 2, confirm the appropriateness of the model to be further tested in reliability and validity.

Table 1: Distribution of respondents by demographic and occupational variables

Measure	Items	No. of respondents	%
Gender	Male	188	85.5
	Female	32	14.5
Age	30-≤40	60	27.3
	40-≤50	82	37.3
	50-≤60	59	26.8
	60-≤70	19	8.6
Experience	1-≤5	52	23.6
	5-≤10	41	18.6
	10-≤15	53	24.1
	15-≤20	29	13.2
	20-≤25	35	15.9
	25-≤30	10	4.5
University	Public	123	55.9
	Private	97	44.1
School	Scientific	64	26.8
	Humanity	156	73.2

n=220

Table 2: Goodness-of-fit indices for the structural model

Fit index	Recommended value	Structural model
χ^2	-	1218.43
χ^2/df	(<5.00)	3.237
CFI	(0-1)	0.921
GFI	(0-1)	0.898
RMSEA	(0-0.08)	0.065

Sources: Hair et al. (2010)

Table 3: Internal reliability metrics for the research constructs

Factor	No. of items	Cronbach's alpha (α)	Macdonald (ω)
Task-Ch	3	0.879	0.943
Tech-Ch	3	0.784	0.792
Ind-Ch	3	0.759	0.761
TTF	3	0.843	0.849
Perf-Exp	4	0.903	0.829
Eff-Exp	3	0.826	0.832
Soc-Inf	3	0.909	0.746
Fac-Con	3	0.841	0.831
Per-T	4	0.836	0.937
Per-Aut	3	0.808	0.861
Cont-Int	3	0.914	0.961
Mgt-Sup	3	0.864	0.888
Com-Eff	3	0.829	0.838

The initial signs provided in Table 2 prove the general strength of the suggested framework. Having determined the basic strength of the model, the analysis moves to a stringent assessment of the psychometric attributes of the model. This implies that a number of diagnostic tests need to be carried out, namely, internal, convergent, discriminant, and divergent validity with an aim of determining whether the measurement instrument has the required accuracy and conceptual specificity to undergo additional empirical testing.

4.2. Reliability

The reliability was determined in two aspects, including Cronbach alpha (omega) to measure internal consistency and McDonald omega to measure squared standardized loadings. Table 3 indicates that the lowest value of Cronbach alpha was obtained with Ind-Ch (0.759), and the lowest value of McDonalds omega with Soc-Inf (0.746). All values are above the 0.700 threshold (Cooper et al., 2006), which means that the instrument is very reliable in all the independent variables.

4.3. Convergent Validity

The instrument validity was confirmed with the use of Confirmatory Factor Analysis (CFA) (Table 4). The factor loading had the minimum of 0.547 (Task-Ch) and the maximum of 0.976 (task technology). Since all the loadings met the required 0.50 threshold, the measurement model shows a sufficient convergent validity.

4.4. Divergent and Discriminant Validity

The divergent validity was evaluated through cross-loadings, where items were loaded more on their target latent factors as compared to other factors (Table 4). Also, inter-correlations were used to determine the discriminant validity (Table 5). Based on the rule that the correlations must not exceed 0.700 to make a distinction between constructs, the outcomes of the study proved that all inter-correlation coefficients did not exceed the limit and the discriminant validity was achieved.

4.5. Descriptive Analysis of the Research Factors

Each of the 41 measurement items was subjected to a detailed descriptive analysis in the 13 research constructs. According to the results of the 220 respondents, the average scores of individual items were 3.10 (Soc-Inf3) to 4.51 (Task-Ch1 and Task-Ch3). These findings mean that most respondents had a positive attitude towards the e-learning environment at item level with most of the scores being positioned on the side with the Agree and Strongly Agree Likert scale. Also, the standard deviation rates were not high (between 0.57 and 1.16), which indicates the same agreement among the academic scholars that were surveyed. In order to establish the integrity of the following parametric analysis, skewness was used to evaluate data normality. The skewness of all 41 items was observed to be within reasonable limits (less than the absolute value of 2.0), which proves that the distribution of the individual item responses did not significantly differ with normal distribution.

Table 4: Matrix of item cross loadings

Factors	Item Code	Factor loadings	Factors/Loadings												
			1	2	3	4	5	6	7	8	9	10	11	12	13
Task-Ch (1)	Task-Ch1	0.775	**0.398**	0.219	0.104	0.212	0.177	0.142	0.014	0.049	0.262	0.091	0.047	0.089	0.019
	Task-Ch2	0.648	**0.498**	0.207	0.212	0.009	0.093	0.255	0.162	0.037	0.128	0.013	0.116	0.173	0.047
	Task-Ch3	0.548	**0.411**	0.041	0.152	0.104	0.026	0.110	0.087	0.152	0.107	0.238	0.087	0.141	0.208
Tech-Ch (2)	Tech-Ch1	0.767	0.177	**0.477**	0.313	0.104	0.282	0.320	0.176	0.266	0.152	0.197	0.230	0.209	0.332
	Tech-Ch2	0.796	0.137	**0.425**	0.103	0.052	0.158	0.068	0.142	0.136	0.287	0.137	0.180	0.115	0.172
	Tech-Ch3	0.559	0.125	**0.354**	0.238	0.157	0.174	0.287	0.016	0.109	0.152	0.252	0.127	0.081	0.216
Ind-Ch (3)	Ind-Ch1	0.720	0.146	0.223	**0.474**	0.367	0.261	0.311	0.188	0.292	0.182	0.189	0.200	0.183	0.268
	Ind-Ch2	0.765	0.134	0.323	**0.431**	0.036	0.113	0.081	0.099	0.070	0.211	0.094	0.156	0.035	0.110
	Ind-Ch3	0.559	0.162	0.301	**0.339**	0.176	0.178	0.261	0.028	0.167	0.132	0.255	0.108	0.159	0.168
TTF (4)	TTF1	0.699	0.209	0.175	0.275	**0.352**	0.140	0.181	0.100	0.247	0.132	0.260	0.078	0.102	0.181
	TTF2	0.976	0.240	0.604	0.500	**0.481**	0.141	0.162	0.110	0.227	0.320	0.268	0.183	0.231	0.245
	TTF3	0.591	0.261	0.223	0.249	**0.415**	0.255	0.148	0.214	0.172	0.042	0.167	0.274	0.124	0.073
Perf-Exp (5)	Per-Exp1	0.836	0.222	0.317	0.365	0.313	**0.531**	0.383	0.372	0.332	0.249	0.221	0.118	0.258	0.081
	Per-Exp2	0.686	0.081	0.177	0.164	0.194	**0.290**	0.016	0.074	0.004	0.231	0.205	0.038	0.020	0.141
	Per-Exp3	0.769	0.129	0.097	0.141	0.185	**0.309**	0.083	0.108	0.157	0.151	0.143	0.224	0.081	0.037
	Per-Exp4	0.711	0.059	0.208	0.149	0.021	**0.278**	0.104	0.143	0.112	0.138	0.119	0.128	0.158	0.082
Eff-Exp (6)	Eff-Exp1	0.723	0.367	0.098	0.039	0.059	0.057	**0.356**	0.011	0.015	0.163	0.212	0.046	0.043	0.076
	Eff-Exp2	0.847	0.135	0.267	0.436	0.185	0.427	**0.421**	0.226	0.297	0.285	0.141	0.372	0.299	0.096
	Eff-Exp3	0.673	0.035	0.152	0.211	0.278	0.204	**0.414**	0.123	0.130	0.090	0.306	0.271	0.183	0.262
Soc-Inf (7)	Soc-Inf1	0.682	0.083	0.102	0.059	0.239	0.030	0.067	**0.427**	0.102	0.014	0.050	0.063	0.050	0.081
	Soc-Inf2	0.683	0.228	0.288	0.257	0.159	0.254	0.484	**0.375**	0.315	0.109	0.147	0.234	0.247	0.120
	Soc-Inf3	0.651	0.027	0.099	0.032	0.183	0.249	0.046	**0.524**	0.191	0.116	0.053	0.202	0.273	0.015
Fac-Con (8)	Fac-Con1	0.800	0.049	0.182	0.216	0.118	0.253	0.155	0.270	**0.412**	0.077	0.002	0.186	0.212	0.118
	Fac-Con2	0.690	0.050	0.037	0.003	0.283	0.262	0.125	0.018	**0.353**	0.223	0.259	0.108	0.147	0.210
	Fac-Con3	0.753	0.143	0.270	0.273	0.256	0.120	0.240	0.236	**0.478**	0.114	0.267	0.202	0.219	0.010
Per-T (9)	Per-T1	0.800	0.176	0.252	0.232	0.064	0.006	0.232	0.185	0.225	**0.367**	0.118	0.171	0.161	0.003
	Per-T2	0.893	0.025	0.242	0.181	0.236	0.258	0.212	0.012	0.292	**0.351**	0.221	0.238	0.131	0.128
	Per-T3	0.878	0.051	0.049	0.038	0.170	0.158	0.009	0.249	0.208	**0.385**	0.142	0.163	0.163	0.116
Per-Aut (10)	Per-Aut1	0.565	0.141	0.017	0.004	0.093	0.059	0.134	0.110	0.055	0.108	**0.482**	0.058	0.158	0.037
	Per-Aut2	0.697	0.033	0.044	0.047	0.044	0.211	0.165	0.047	0.292	0.160	**0.321**	0.190	0.184	0.194
	Per-Aut3	0.751	0.064	0.225	0.296	0.028	0.003	0.059	0.154	0.166	0.058	**0.336**	0.004	0.016	0.082
	Per-Aut4	0.716	0.050	0.037	0.038	0.141	0.052	0.282	0.206	0.187	0.265	**0.381**	0.059	0.277	0.216
Cont-Int (11)	Cont-Int1	0.885	0.091	0.140	0.163	0.144	0.063	0.236	0.118	0.174	0.098	0.170	**0.351**	0.114	0.311
	Cont-Int2	0.925	0.284	0.174	0.146	0.051	0.186	0.133	0.290	0.166	0.269	0.200	**0.348**	0.008	0.036
	Cont-Int3	0.846	0.009	0.141	0.207	0.270	0.038	0.020	0.070	0.015	0.088	0.341	**0.038**	0.055	0.263
Mgt-Sup (12)	Mgt-Sup1	0.949	0.168	0.295	0.326	0.031	0.016	0.169	0.303	0.082	0.076	0.192	0.217	**0.396**	0.048
	Mgt-Sup2	0.857	0.008	0.129	0.201	0.087	0.136	0.275	0.005	0.116	0.083	0.103	0.025	**0.381**	0.138
	Mgt-Sup3	0.578	0.033	0.228	0.230	0.172	0.243	0.233	0.247	0.200	0.047	0.277	0.096	**0.387**	0.210
Com-Eff (13)	Com-Eff1	0.905	0.148	0.225	0.251	0.275	0.173	0.170	0.027	0.003	0.080	0.319	0.267	0.155	**0.401**
	Com-Eff2	0.642	0.021	0.034	0.009	0.046	0.058	0.195	0.030	0.125	0.032	0.023	0.113	0.042	**0.406**
	Com-Eff3	0.704	0.065	0.076	0.035	0.125	0.230	0.066	0.136	0.221	0.158	0.069	0.075	0.193	**0.384**

The descriptive statistics of 13 research factors are provided in Table 6. The average values are between 3.45 and 4.45, showing that the attitude towards e-learning environment is rather positive. All factors are rated on a five point scale as either High or the Moderate level of agreement.

4.6. Hypotheses Testing Results

In order to achieve the statistical validity of the proposed model, rigorous diagnostic testing steps were performed on the data before performing the multiple linear regression. This was done by ensuring that the dataset was normally distributed and that there was no significant inter-correlations between the predictors hence meeting the important conditions of normality and multicollinearity.

Table 7 describes the normality measures, such as skewness and kurtosis, which are used to assess how the sample data compares with a hypothetical normal distribution. Skewness values were between −0.204 (Per-Aut) and −0.787 (Mgt-Sup); this again fits well within the generally accepted academic range between −3 and +3. The amount of kurtosis, a measure of the shape and the peak of the distribution curve, was the highest at 0.997. As this is far short of the threshold of 7.0, the data is verified to be normally distributed.

The Variance Inflation Factor (VIF) and Tolerance tests were used to assess multicollinearity. The values of VIF <5 show that there is no significant problem of collinearity, whereas values between 5 and 10 show that the problem is moderate. In this analysis, the VIFs were all below 10 which means that there was low collinearity among the predictors. Moreover, the tolerance values, which are the inverse of the VIF, were also above the 0.05 level, which once again proves that multicollinearity does not undermine the integrity of the regression coefficients. The use of linear regression was considered to be appropriate with these conditions being meet.

Table 5: Correlation matrix of the study constructs

Factors	Factors												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Task-Ch	1												
2. Tech-Ch	0.360	1											
3. Ind-Ch	0.355	0.644	1										
4. TTF	0.247	0.499	0.467	1									
5. Perf-Exp	0.192	0.502	0.445	0.455	1								
6. Effort expectation	0.389	0.540	0.523	0.439	0.495	1							
7. Soc-Inf	0.199	0.257	0.217	0.457	0.401	0.307	1						
8. Fac-Con	0.120	0.421	0.427	0.550	0.534	0.442	0.454	1					
9. Per-T	0.227	0.490	0.426	0.429	0.467	0.391	0.382	0.658	1				
10. Per-Aut	0.253	0.471	0.428	0.593	0.621	0.550	0.302	0.439	0.438	1			
11. Cont-Int	0.189	0.442	0.377	0.420	0.465	0.511	0.444	0.582	0.520	0.656	1		
12. Mgt-Sup	0.306	0.334	0.301	0.393	0.401	0.447	0.552	0.492	0.413	0.482	0.529	1	
13. Com-Eff	0.201	0.288	0.258	0.308	0.388	0.362	0.160	0.281	0.226	0.358	0.390	0.329	1

Table 6: Descriptive profile and importance index of the conceptual framework

Factor	Mean	SD	MI %	Level
Task-Ch	4.45	0.48	88.9	High
Tech-Ch	4.04	0.66	80.7	High
Ind-Ch	4.08	0.61	81.9	High
TTF	3.56	0.84	71.1	Moderate
Perf-Exp	3.45	0.88	68.9	Moderate
Eff-Exp	4.05	0.67	80.9	High
Soc-Inf	3.61	0.75	72.1	Moderate
Fac-Con	3.67	0.76	73.3	Moderate
Per-T	3.52	0.88	70.3	Moderate
Per-Aut	3.85	0.65	76.9	High
Cont-Int	3.57	0.95	71.3	Moderate
Mgt-Sup	3.78	0.79	75.5	High
Com-Eff	3.93	0.69	78.5	High

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

Table 7: Normality and collinearity assessment of the predictor variables

Code	Factors	Skewness	Kurtosis	VIF	Tolerance
TTF	Task-Ch	(0.295)	(0.997)	0.868	1.152
	Tech-Ch	(0.686)	0.655	0.109	9.212
	Ind-Ch	(0.540)	0.391	0.109	9.172
	TTF	(0.569)	(0.266)	0.364	2.744
UTAUT	Perf-Exp	(0.468)	0.131	0.352	2.839
	Eff-Exp	(0.500)	0.422	0.602	1.660
	Soc-Inf	(0.093)	(0.321)	0.594	1.683
	Fac-Con	(0.529)	0.110	0.438	2.282
	Cont-Int	(0.598)	(0.105)	-	-
	Per-T	(0.549)	0.334	0.528	1.895
	Per-Aut	(0.204)	0.351	0.468	2.139
	Mgt-Sup	(0.787)	0.543	0.526	1.901
	Com-Eff	(0.455)	0.155	0.781	1.280

Values between brackets are negative

4.7. Testing Hypotheses 1, 2 and 3

Multiple regression test was employed to analyze the impact of individual, task, and technology characteristics on Task-Technology Fit (TTF).

Table 8 indicates an F-value of 20.78 that was found to be statistically significant ($P < 0.001$). The coefficient of determination (R^2) was 25.5, which is the percentage variance in TTF that is explained by the three independent variables. All three factors had statistically significant T-values ($P < 0.001$), which led to the conclusion that each of the three factors has a strong influence on TTF. Remarkably, technology characteristics changes (Tech-Ch) were observed to have the largest impact on the perceived fit.

4.8. Hypotheses 4 through 12

A second multiple linear regression analysis was conducted to evaluate the remaining hypotheses (H_4-H_{12}).

Table 9 displays the results with a model F-value of 47.2 which is significant ($P < 0.001$). This model had an R2 value of 84.1, which implies that the independent variables have been able to explain a very high percentage of variability of the dependent variable (Continuance Intention). This large value of the coefficient of determination indicates that the integrated model has a high predictive value of e-learning continuity in the Jordanian education setting. Table 10 summarizes the results of research hypothesis testing.

5. DISCUSSION AND CONCLUSION

The main aim of the study was to develop and test a holistic model of e-learning continuity by integrating the Task-Technology Fit (TTF) model with the Unified Theory of Acceptance and Use of Technology (UTAUT) model and other important external facilitators. This integration is highly supported by the empirical results, which show that the proposed model has the high predictive power (R^2 = 84.1) when it comes to exploring the continuance intention of academic faculty in Jordan. This study will overcome the shortcomings of the standalone models as it focuses on technological, individual, and organizational aspects at the same time, and the holistic nature of professional technology adoption is usually not considered by the standalone models (Amoako-Uni and Melham, 2023).

One of the key conclusions of this paper is the importance of the mechanism of fit. The findings verify the fact that an individual perceives a high level of congruence among his personal traits (Individual Characteristics), the type of teaching work (Task Characteristics), and the particular features of the e-learning system (Technology Characteristics), and his desire to remain with the system increases exponentially. This is in accordance with the positioning statements of Goodhue and Thompson (1995), who

Table 8: Regression analysis of the antecedents of task-technology fit

Factors	Regression indicators				Coefficients			
	R^2	Adj. R^2	F	Sig. (p)	B	SE	T	Sig. (t)
Ind-Ch	0.255	0.243	20.78	0.000	0.267	0.056	4.840	0.000
Task-Ch					0.319	0.120	2.650	0.008
Tech-Ch					0.647	0.047	14.04	0.000

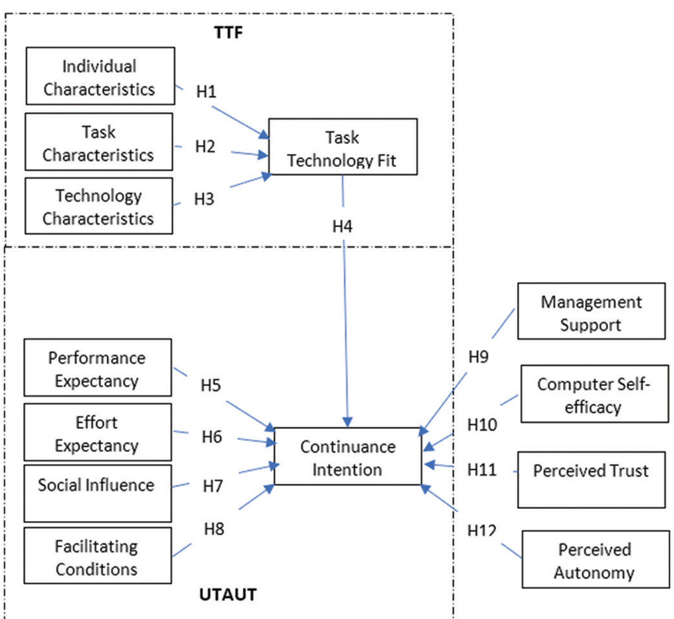
Table 9: Regression analysis for factors influencing continuance intention

Factors	Regression indicators				Coefficients			
	R^2	Adj. R^2	F	Sig (p)	B	SE	T	Sig (t)
TTF	0.841	0.706	0.691	47.196	0.000	0.076	3.131	0.002
Per-Exp					0.382	0.074	5.155	0.000
Eff-Exp					0.327	0.075	4.347	0.000
Soc-Inf					0.214	0.068	3.175	0.002
Fac-Con					0.387	0.077	5.015	0.000
Per-T					0.278	0.060	4.611	0.000
Per-Aut					0.227	0.088	2.589	0.010
Mgt-Sup					0.165	0.068	2.435	0.016
Com-Eff					0.359	0.064	5.618	0.000

Table 10: Results of hypothesis testing for the integrated framework

Hypothesis	Independent	Dependent	Impact	P-value	Result
H_1	Ind-Ch --->	TTF	0.266	0.000	Supported
H_2	Task-Ch --->		0.318	0.009	Supported
H_3	Tech-Ch --->		0.646	0.000	Supported
H_4	TTF --->	Cont-Int	0.239	0.002	Supported
H_5	Perf-Exp --->		0.382	0.000	Supported
H_6	Eff-Exp --->		0.327	0.000	Supported
H_7	Soc-Inf --->		0.214	0.002	Supported
H_8	Fac-Con --->		0.387	0.000	Supported
H_9	Per-T --->		0.278	0.000	Supported
H_{10}	Per-Aut --->		0.227	0.010	Supported
H_{11}	Mgt-Sup --->		0.165	0.016	Supported
H_{12}	Com-Eff --->		0.359	0.000	Supported

Figure 1: Unified framework for E-learning continuity



declared that the performance and usage are only maximized in case technology has been designed to satisfy the special needs of the user functions. It is worth noting that technology characteristics were the best predictors of TTF, implying that the credibility and functionality of the software are the main channels through which the faculty considers the utility of the system. This supports the research of Wan et al. (2020), making it clear that the features of e-learning, including quiz management and sharing of resources should be perfectly implemented to ensure a sense of professional fit.

Moreover, the combination of the UTAUT constructs gave a fine understanding of the social and psychological forces in action. Such high performance of Performance Expectancy (Performance Expectancy) and Facilitating Conditions (Facilitating Conditions) are indicative of the results of Venkatesh et al. (2003) and Farooq et al. (2023) who found that faculty are pragmatists; they still work with systems that enhance their pedagogical effectiveness and have strong institutional support. The mean scores of these factors (high to moderate 3.44-4.44) suggest that the scholars of Jordan are mostly positive about the e-learning tool, as long as the infrastructure, including technical support and high-speed internet are stable (Yakubu and Dasuki, 2019).

One of the best contributions of this study is perhaps the validation of the extended exogenous variables: Perceived Autonomy

(Perceived Autonomy), Management Support (Management Support), Computer Self-Efficacy (Computer Efficacy), and Perceived Trust (Perceived Trust). The reason is the direct and important effect of Computer Self-Efficacy, which supports the theory that a sense of individual digital competence is a precondition of long-term engagement (Bandura, 1986; Katsarou, 2021). Equally, the Perceived Autonomy role reveals an essential academic concern; faculty members will be more willing to accept e-learning when perceived as a way of empowering their self-determined approach to teaching and not an administrative mandate (Deci and Ryan, 2012; Lenkaitis, 2020). Lastly, the addition of Perceived Trust resolves the emerging issue in online education on the question of data safety and system reliability since lack of trust will always result in user resistance (Alharbi, 2017).

To sum up, the paper has a strong theoretical contribution as it has presented an integrated model which explains the intricate processes of e-learning persistence. In practice, the findings provide a guide to university administrators and developers in third world countries. To achieve long-term use, it is necessary to do more than to provide software; to provide an enabling environment based on technical reliability, management support, and maintenance of academic independence. With these multidimensional factors, universities will be able to shift their short-term e-learning use to a long-term, digital learning culture.

5.1. Contribution to Knowledge

The research contributes greatly to the body of theoretical literature by covering both cultural and contextual peculiarities of technology adoption in third world countries. Although the traditional models usually address the functional utility, this study highlights that the research of the technology adoption demands a more thorough consideration of individual and psychological levels. Combining the four variables of Perceived Autonomy, Management Support, Computer Self-Efficacy, and Perceived Trust with the previously existing UTAUT and TTF frameworks, the study offers a more comprehensive view of how the scholars develop their perceptions of the long-term use of e-learning systems. The confirmation of these hypothetical associations adds to the literature because it shows that these exogenous variables are not peripheral variables but core components of structural integrity of a continuance intention predictive model. The results indicate that in order to promote digital learning among university scholars, the researchers need to consider not only the surface fit of the tool but also the internal and organizational forces that contribute to the persistence (Almaiah et al., 2019; Bervell and Cooper, 2020; Jaradat et al., 2020).

5.2. Contribution to Practice

Practically speaking, the findings are a roadmap to system developers and university administrators. The developers should understand that the aspect of sustainable use is not accomplished through generic platforms but a system tailored to the particular pedagogical needs of academic activities. In the case of e-learning centers, the research indicates that faculty commitment depends on a favourable ecosystem. This also involves giving visible management assistance, building the digital confidence of scholars and ensuring that the facilitating conditions, including technical infrastructure, are well-established. Moreover, the administrators need to safeguard the perceived independence of educators and render the platform a secure space to disclose sensitive academic information. Since the perception of scholars is also influenced by social influence, as well as peer attitudes, universities ought to promote collaborative digital culture. In the end, the rich knowledge of the ways that the specific characteristics of individual learners can be used to match the requirements of the tasks will enable developers to make the learning environment more flexible and effective, resulting in more consistent and successful learning outcomes in higher education.

5.3. Limitations and Recommendations for Future Research

This study has limitations despite the contributions that it has made. First, the data collection was based on non-randomised selection of respondents thus restricting the generalisation of the results to all academic settings. Moreover, the fact that the study is cross-sectional implies that the faculty perceptions are recorded at one moment in time, and not the development of their behavior is followed. It is advisable that future studies should expand this integrated model by using it in other geographical areas or by various levels of education to determine its cross-contextual validity. Furthermore, the paper might be complemented by future research including other emerging variables, including Perceived Enjoyment or Artificial Intelligence Anxiety to improve our knowledge of the factors that promote the adoption of educational technologies in the long term.

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