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Development of a conceptual model for continuous intention to use eLearning

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Abstract

Universities globally are progressively adopting eLearning as a cost-effective alternative to traditional face-to-face education, with a focus on pure online courses that deliver content entirely online. However, despite the expanding research on eLearning, significant limitations remain. Expectation Disconfirmation Theory (EDT), the prevalent theory for understanding continuance intentions in eLearning systems, is often tested using cross-sectional data at a single point in time. Additionally, the impact of social influence, a recognized driver of technology use in collectivist cultures, on the continuous intention to use eLearning is underexplored and has produced inconsistent findings. To address these gaps, this study proposes a conceptual model for the continuous intention to use eLearning in technical courses of varying complexity, contributing to a more nuanced understanding of this increasingly adopted educational approach. It describes how the model was pretested and how data was collected. Future research will be oriented toward the validation of this model.

Keywords: online learning, learning expectation, learning performance, design aesthetics, design-expectations fit, continuance intention to use

Introduction

Electronic Learning (eLearning) has emerged as a significant factor in educational delivery systems, enhancing the learning experience by providing interactive tools and content that engage and motivate students (S. Li et al., 2019). The Babson Survey Research Group has been tracking e-learning in over 2,800 universities since 2002 and has observed an increasing trend in colleges incorporating e-learning into their strategies. Their findings showed a rise in e-learning students from 1.6 million in 2002 to 5.8 million in 2014 (Allen & Seaman, 2016). Recent studies have shown strong support for increased technology use among faculty, with over two-thirds expressing interest in experimenting with new teaching methods and tools (S. Li et al., 2019). Notably, most faculty members who have taught online courses reported improvement in their teaching skills. Furthermore, 70% of students preferred courses with online components (G. Li et al., 2019), and students favored interacting with others using technology (Chen & Siau, 2016).

Despite the extensive research on eLearning and its acknowledged significance, our literature review has identified a critical gap in the field's understanding of eLearning dynamics. The majority of quantitative studies on eLearning adopt a cross-sectional approach, with only a few exceptions (Limayem & Cheung, 2008, 2011; Lowry et al., 2015). These cross-sectional studies, while valuable, offer only a static snapshot

of eLearning at a specific point in time, thereby limiting the depth of our understanding of the temporal evolution of eLearning usage. In contrast, longitudinal studies can illuminate the dynamics of eLearning adoption and sustained use, enabling us to discern usage patterns, identify factors influencing persistent engagement or attrition, and evaluate the long-term impact of eLearning on educational outcomes. Moreover, longitudinal studies offer a more nuanced view of individual differences and facilitate more robust causal inferences. In addition, social influence has been an absent factor in the studies that we have reviewed, which can be a significant factor in collectivist cultures such as Arab societies (Rouibah, 2008, 2016). To address this identified gap, this study endeavors to construct a longitudinal model for the continuous use of eLearning, grounded in the Expectation Disconfirmation Theory (EDT) (Oliver, 1980).

This study unfolds in the following manner. Initially, we review the literature on eLearning, focusing on the relevant theories that have evolved from the EDT. Drawing from this literature review, we subsequently introduce our proposed research model, which serves as an extension of the Multi-Motive Information Systems Continuance (MISC) model (Lowry et al., 2015). Following this, we outline the research methodology, encompassing both the construction of the research instrument and the design of the longitudinal survey. We conclude by acknowledging the limitations of our study and suggesting potential avenues for future research.

Theoretical Background

Expectation Disconfirmation Theory (EDT)

EDT, a prominent framework in the Information Systems (IS) field, elucidates continuance intentions in eLearning systems. Originating from consumer behavior research, EDT posits that continuance intentions are influenced by user satisfaction and the fulfillment of initial expectations (Oliver, 1980). EDT was adapted in the field of IS to explain that if a system meets or exceeds expectations, it fosters user satisfaction and encourages continued use. Conversely, if the system underperforms, it may lead to dissatisfaction and discontinued use (Bhattacherjee, 2001). As illustrated in Figure 1, the model suggests that satisfaction, shaped by expectation, perceived performance, and disconfirmation, significantly impacts continuance intention. Expectation refers to pre-use beliefs about a system's anticipated usefulness or performance, while perceived performance is an evaluation of outcomes post-use. Disconfirmation, the difference between expectation and perceived performance, can be positive when performance exceeds expectation, leading to satisfaction. Over time, EDT has been adapted to reflect the unique characteristics of various IS, including eLearning. This study reviews key EDT extensions in the IS field that have informed our understanding of eLearning. These insights serve as the foundation for our proposed research model.

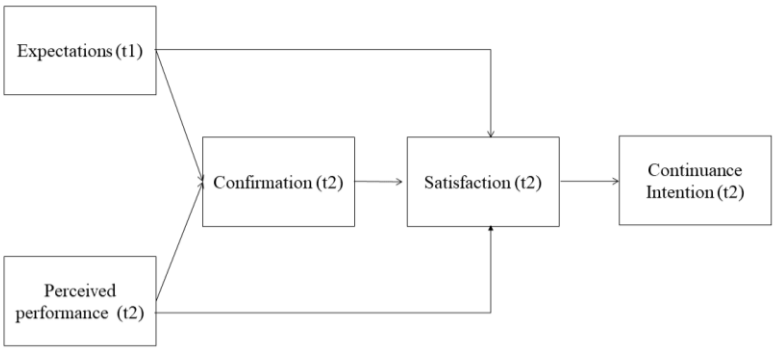

Figure 1: EDT Model

Post-Adoption Model (PAM1)

Bhattacherjee (2001) proposed the Post-Adoption Model (PAM1), a specialized framework for examining continuance use within the realm of IS. PAM1 adapts the EDT to the IS context through three substantial alterations as depicted in Figure 2. Firstly, it substitutes expectations with perceived usefulness, which is conceptualized as a user's belief about the actual performance of the system or the anticipated benefits of its use (Davis, 1989). Secondly, PAM1 eliminates the notion of perceived performance from the post-adoption phase. Lastly, it models the continuance intention to use as a direct consequence of the disparity between perceived usefulness in the pre-adoption phase and confirmation in the post-adoption phase. Despite these advancements, PAM1 exhibits two significant limitations: It excludes attitude, a pivotal variable in most adoption models, and it neglects to incorporate temporal perceptions that occur before and after the behavior.

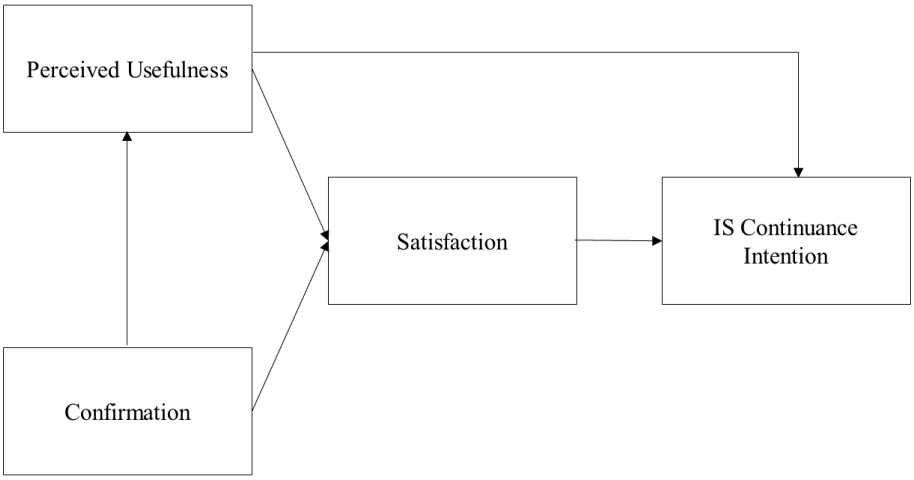

Figure 2: PAM1 Model

Improved Post-Adoption Model (PAM2)

To address the previously identified limitations in PAM1, Bhattacherjee and Premkumar (2004) proposed the improved Post-Adoption Model (PAM2). In PAM2, as depicted in Figure 3, satisfaction and attitude are distinguished as separate constructs as proposed originally by Oliver (1980). Satisfaction serves as an antecedent to post-exposure attitude. It refers to an individual's post-consumption evaluation of a specific transaction (Bolton & Drew, 1991; Hunt, 1977; Rouibah & Al-Hassan, 2019). On the other hand, attitude is defined as an individual's overall evaluation of a product or service. It represents an emotion concerning the degree of pleasure or displeasure with a product or service (Ajzen, 1991). In contrast, satisfaction is an evaluation of that emotion based on the performance of the product or service (Hunt, 1977).

PAM2 establishes a series of relationships among these constructs. Initial expectations (Usefulness in the pre-adoption phase) influence both Attitude in the pre-adoption phase and Satisfaction. Satisfaction, in turn, influences Attitude in the post-adoption phase. Attitude in the pre-adoption phase also influences Attitude in the post-adoption phase. Disconfirmation links initial expectations (Usefulness in the pre-adoption phase) to potential performance (Usefulness in the post-adoption phase). Both actual performance (Usefulness in the post-adoption phase) and Attitude in the post-adoption phase contribute to increasing IS continuance use.

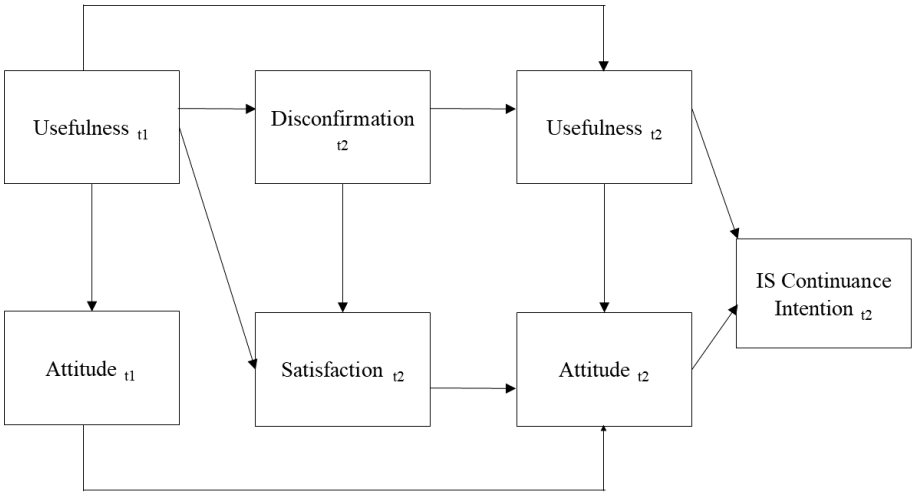

Figure 3: PAM2 Model

Multimotive Information System Continuance Model (MISC)

PAM2, despite its advancements, suffers from a number of limitations (Lowry et al., 2015; Rouibah & Al-Hassan, 2019). First, it only considers extrinsic motivations, neglecting situations driven by intrinsic motivations such as emotional responses related to anticipated experiences. Second, it does not consider the fit between the task and the technology. Third, the operationalization of performance expectations through perceived usefulness, a practice that has been in place since the introduction of PAM1 (Bhattacherjee, 2001), is considered a limited representation of the multifaceted nature of user expectations. Lastly, a consequence of the aforementioned limitations is that the model demonstrates a lower explanatory power in predicting disconfirmation. This is evidenced by a lower coefficient of determination R^2, suggesting that there may be other unaccounted factors influencing disconfirmation.

Addressing the limitations of PAM2, Lowry et al. (2015) proposed the MISC model. This model introduces three new variables as shown in Figure 4: Design Expectations Fit (Kim & Stoel, 2004), the alignment between the technology's design and the anticipated task; Perceived Ease of Use (Davis, 1989), the belief in the system's effortless use; and Design Esthetics (Cyr et al., 2009), the perceived professionalism of the user interface. These variables are hypothesized to influence disconfirmation and post-adoption beliefs (i.e., modified beliefs), thereby enriching the MISC model's scope.

When Lowry et al. (2015) tested the MISC model within an eLearning context, they found limited support for a direct link between learning performance, being one of the post-adoption beliefs, and continuance intention to use. However, they did succeed in enhancing the model's explanatory power for disconfirmation, particularly noting that Design Expectations Fit, among the three external factors, serves as a surrogate for underlying disconfirmation and modification of beliefs.

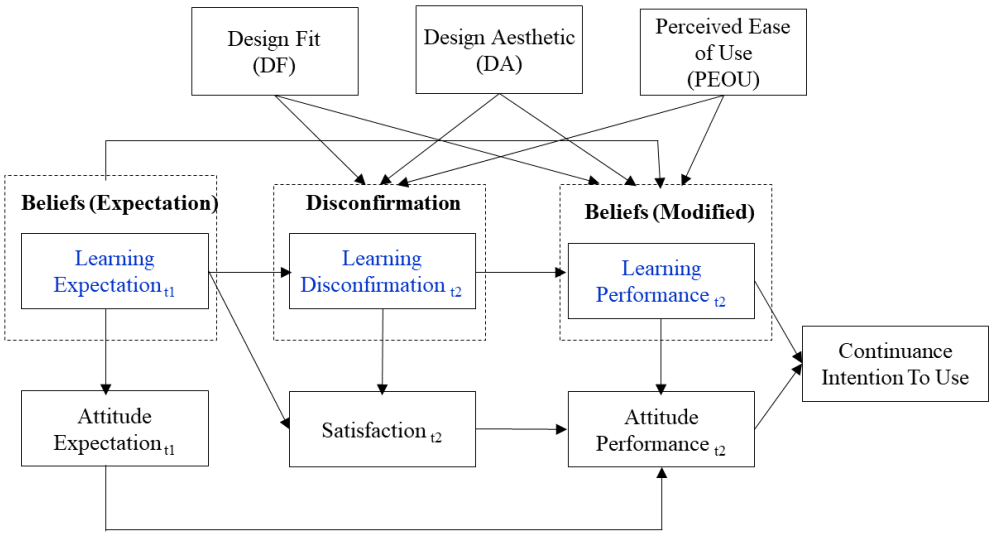

Figure 4: MISC Model

The MISC model, despite its advancements, has several limitations. Firstly, while the MISC model was tested in multiple contexts, it does not account for the impact of social influence or social norms, which are significant factors in collectivist cultures such as Arab societies (Rouibah, 2008, 2016). Secondly, the MISC model does not consider the effect of task complexity on participants, leaving it unclear how the ease or difficulty of tasks will affect continuous use. Lastly, participants were not fully immersed in a pure eLearning environment, and the study did not report the time spent by students and participation was voluntary (Lowry et al., 2015). In the next section, we build our research model to address these aforementioned limitations in MISC.

Research Model

We plan to enhance the MISC model in several ways. Generally, we aim to incorporate subjective norm as a belief expectation and belief modification, mediating the effect of external factors on the continuous intention to use eLearning (Schepers & Wetzels, 2007). We also intend to examine the role of task complexity in an eLearning context, hypothesizing that students may continue using an eLearning system if the tasks are not perceived to be complex. Furthermore, we plan to include computer self-efficacy, a switching cost, in our improved model, as individuals with high self-efficacy tend to lessen their computer anxiety (Fuller et al., 2006; Thatcher & Perrewe, 2002). Lastly, we aim to address the methodological limitations of Lowry et al.'s study by fully immersing participants in a pure eLearning environment and accounting for the time spent and perceived task complexity by students. More specifically, we make the following enhancements to MISC:

- We incorporate superior influence, a form of social influence or social norms characteristic of Arab collectivist culture. This addition recognizes the significant role of societal expectations in shaping individual continuous behavior in these societies.

- We introduce the concept of attractiveness of alternatives, reflecting students' preference for face-to-face learning models. This factor, renamed as complementarity/substitution during the pre-test phase, acknowledges the Arab cultural value placed on direct, face-to-face interactions, often characterized by verbal cues, facial expressions, and gesticulations (see research methodology).

- We include self-efficacy, a factor shown to play a crucial role in continuous use (Chiu & Wang, 2008; Roca et al., 2006). Originating from the Social Cognitive Theory (Bandura, 1982), and introduced to the information system field by Compeau & Higgins (1995), self-efficacy refers to users' beliefs and confidence in their ability to acquire the necessary skills to use the eLearning system (Rouibah, 2016).

- We test the proposed research model in a quasi-voluntary setting using pure eLearning. This approach is significant as previous studies have indicated differences in continuous use between mandatory and voluntary settings (Bhattacherjee et al., 2018). In our study, students' participation, which contributes to a small fraction of the final course grade, is quasi-voluntary. Students are assigned online tasks and an online exam within a specific timeframe, with their participation accounting for 10% of the total grades.

- Contrary to the majority of previous studies that employed cross-sectional designs, our study aims to validate the proposed model using a longitudinal approach, with data collection occurring at three different times. This method provides a more comprehensive and dynamic understanding of the factors influencing continuous eLearning use.

The resulting initial research model is depicted in Figure 5.

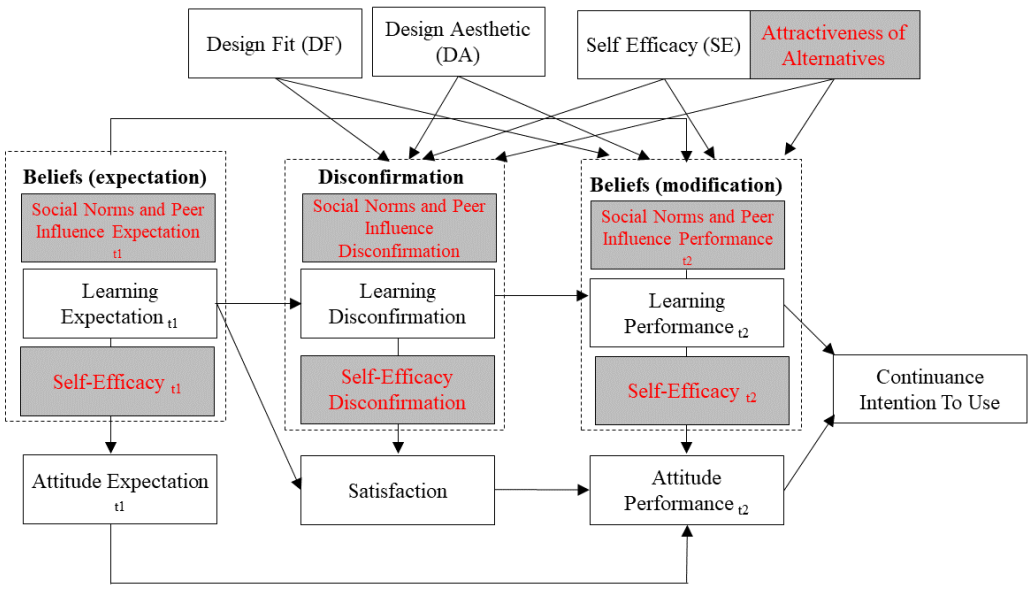

Figure 5: Initial Research Model

Research methodology

To bolster the validity of this study, a two-phase pilot study was conducted prior to the main data collection. In the first phase, the survey instrument was reviewed by a leading expert in the field of MIS. The discussions primarily focused on determining which factors to retain or eliminate in the research model, and which factors should be considered as fixed traits versus those that may change over time.

The expert suggested several modifications:

1. The removal of social norms and influence of peers, replacing it with the influence of superior in the form of instructor influence. This suggestion was based on the study's context of an educational institution and the push towards the adoption of an eLearning platform in a voluntary educational setting.

2. The removal of IT self-efficacy as a pre-expectation and post-measurement, considering it as a trait. Instead, it was recommended to retain it as an antecedent to beliefs.

3. The replacement of attractiveness of alternatives, inspired by instructors' experience, with complementarity/substitution. This term better captures the students' preference for face-to-face courses versus online courses.

In the second phase of the pilot study, the focus was on enhancing the understandability and readability of the questionnaire. The questionnaire was tested with 40 students enrolled in an introductory Management Information Systems course at a prominent university in Kuwait. These students were using an online training system, making them ideal for providing feedback on the questionnaire.

The wording of all items was scrutinized, and the questionnaire was distributed to the students for their feedback. Modifications were made based on their responses. For instance, the item (CS3) under the "Complementarity/Substitution" factor was revised from "I prefer online training system because it gradually replaces some outdated ways of face-to-face training courses" to "I prefer online training system because it replaces some outdated ways of face-to-face courses". Additionally, two items related to IT self-efficacy, initially proposed by Taylor and Todd (1995), were removed due to perceived redundancy. These items were: "SE5: For me having someone around to show me how to use an online service is important" and "SE6: For me feeling comfortable using an online service is important".

The interviews with the students also led to the refinement of four questions related to the online training system. After these modifications, the final questionnaire was reviewed for appropriate wording by two domain experts. Based on their feedback, the research model was subsequently adjusted. In addition to the hypotheses tested in the MISC model (Lowry et al., 2015), we introduce the following hypotheses below and are highlighted in Figure 6.:

H1. *Learning expectation at* t_1 **will have positive effect on** *superior influence expectation* at t_1

H2. *Complementary Substitution* **will have positive effect on** *learning disconfirmation* at $t_{2\&3}$

H3. *Complementary Substitution* **will have positive effect on** *learning performance* at $t_{2\&3}$

H4. *Learning performance* at $t_{2\&3}$ **will have positive effect on** *superior influence* at $t_{2\&3}$

H5. *Superior influence* at $t_{2\&3}$ **will have positive effect on** *continuous intention to use* at $t_{2\&3}$

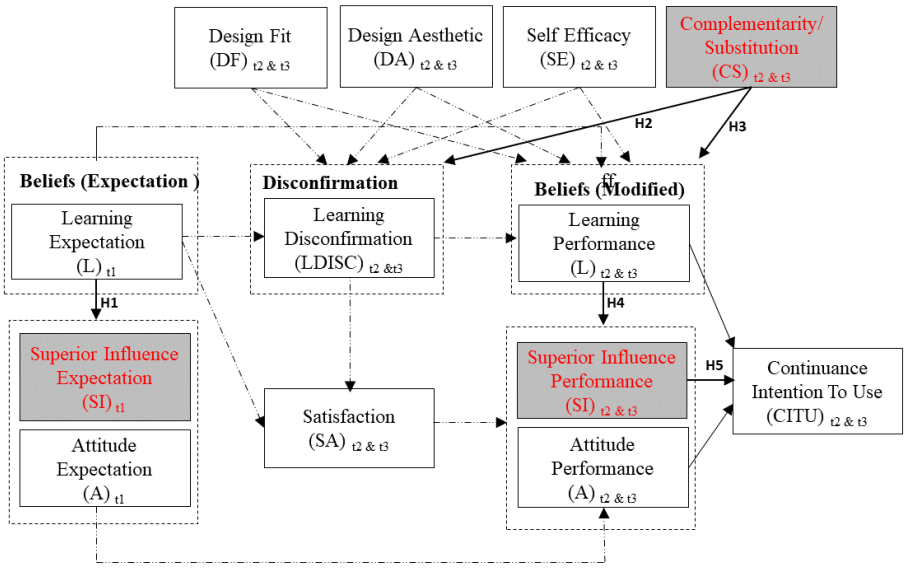

Figure 6: Research Model Following the Pilot

Construct Measurement

The measurement of constructs for this study was primarily based on items adopted and slightly modified from previous research to suit the eLearning context (refer to Table 1 for details). Learning expectation and learning disconfirmation were gauged using three items from the study by Lowry et al. (2015). Attitude was assessed through four items derived from the research conducted by Bhattacherjee and Premkumar (2004). The construct of superior influences was evaluated using four items from the study by Taylor and Todd (1995), while self-efficacy was measured through items proposed by Compeau and Higgins (1995). User satisfaction was determined using four items from the research by Bhattacherjee and Premkumar (2004). The fit of design expectations was assessed through four items from the study by Kim and Stoel (2004), and design aesthetics was evaluated using four items from the research by Cyr, Head, and Ivanov (2006). The construct of complementarity/substitution was gauged using three items inspired by the authors' experience. Lastly, the intention to continue use was measured using four items from the study by Lowry et al. (2015).

Table 1: Construct Validity

Constructs	Items	References
Learning Expectation at time T1 [LT1] Before using the online training system	LT11: The online training system will help me learn new things	(Lowry et al., 2015)
	LT12: The online training system will help me master new concepts	
	LT13: The online training system will help me acquire innovative ideas	
Learning Modification at Time T2 and T3 [LT2/LT3] After using the online training system website for few weeks, we want to know how much you learned using the online training system	LT21 (LT31): The online training system helped me learn new things	(Lowry et al., 2015)
	LT22 (LT32): The online training system helped me master new concepts.	
	LT23 (LT33): The online training system helped me acquire innovative ideas	

Constructs	Items	References
Learning Disconfirmation at Time T2 and T3 [LDISCT2/ LDISCT3] After using the online training system, we now want to know whether your interaction with the online training system was the same, better, or worse than what you were expecting.	LDISCT21 (LDISCT31): Compared to my initial expectations, the ability of the online training system to help me learn new things was much better than expected	(Lowry et al., 2015)
	LDISCT22 (LDISCT32): Compared to my initial expectations, the ability of the online training system to help me master new concepts was much better than expected.	
	LDISCT23 (LDISCT33): Compared to my initial expectations, the ability of the online training system to help me acquire innovative ideas was much better than expected	
Attitude Expectation at time T1 [AT1] Before using the online training system	AT11: Using the online training system will be a good idea	(Bhattacherjee & Premkumar, 2004)
	AT12: Using the online training system will be a wise move	
	AT13: Using the online training system will be a positive step	
	AT14: Using the online training system will be an effective idea	
Attitude Modification at Time T2 and T3 [AT2/AT3] After using the online training system for few weeks, we want to know how much did your attitude change. After using the online training system	AT21 (AT14): I found using the online training system a good idea.	(Bhattacherjee & Premkumar, 2004)
	AT22 (AT24): I found using the online training system a wise move	
	AT23 (AT34): I found using the online training system a positive step	
	AT24 (AT34): I found using the online training system an effective idea	
Superior Influences Expectation at Time T1 [SI] Before using the online training system	SIT11: My professors would think I should use the online training system	(Taylor & Todd, 1995)
	SIT12: Generally speaking, I want to do what my professors think I should do	
	SIT13: I will have to use the online training system because my professors require it	
Superior Influences Modification at Time T2 and T3 [SIT2/SIT3] After using the online training system for a few weeks, we want to know how much superior/instructor affected you. After using the online training system	SIT21 (SIT31): I found my professors to think I should use the online training system	(Taylor & Todd, 1995)
	SIT22 (SIT32): Generally speaking, I found that I have do what my professors think I should do	
	SIT23 (SIT33): I found that I have to use the online training system because my professors require it	

Constructs	Items	References
Self-efficacy at Time T2 and T3 [SET2/SET3]	SET21 (SET31): I would feel comfortable using the online training system on my own	(Taylor & Todd, 1995)
	SET22 (SET32): If I wanted to, I could easily use the online training system	
	SET23 (SET33): For me, being able to easily use the online training system is important	
	SET24 (SET32): I would be able to use the online training system even if no one was around to show me how to use it.	
User Satisfaction at Time T2 and T3 [UST2/UST3]	UST21 (UST31): I am extremely pleased with my use of the online training system.	(Bhattacherjee & Premkumar, 2004)
	UST22 (UST32): I am extremely delighted with my use of the online training system	
	UST23 (UST33): I am extremely contented with my use of the online training system	
	UST24 (UST34): I am extremely satisfied with my use of the online training system	
Design Fit at Time T2 and T3 [DFT2/DFT3]	DFT21 (DFT31): I can interact with the online training system in order to accomplish goals specific to my needs.	(Kim & Stoel, 2004)
	DFT22 (DFT32): The online training system has interactive features, which help me accomplish my task.	
	DFT23 (DFT33): The online training system allows me to interact with it to receive content tailored to my needs.	
	DFT24 (DFT34): The online training system adequately meets my needs	
Design Aesthetics at Time T2 and T3 [DAT2/DAT3]	DAT21 (DAT31): The online training system design (i.e., colors, boxes, menus, etc.) is attractive.	(Cyr et al., 2006)
	DAT22 (DAT32): The online training system looks professionally designed	
	DAT23 (DAT33): The graphics are meaningful	
	DAT24 (DAT34): The overall look and feel of the online training system is visually appealing	

Constructs	Items	References
Complementarity/Substitution at Time T2 and T3 [CST2/CST3]	CST21 (CST31): Compared with traditional face to face teaching I am more interested in online training system	Developed for this study
	CST22 (CST32): Compared with traditional face to face teaching I prefer to study with online training system	
	CST23 (CST33): I prefer online training system because it replaces some outdated ways of face-to-face courses	
Continuance Intention to Use at Time T2 and T3 [CITUT2/ CITUT3]	CITUT21 (CITUT31): I would recommend this online training system to others.	(Lowry et al., 2015)
	CITUT22 (CITUT32): I would recommend that others use this online training system.	
	CITUT23 (CITUT33): I would visit this online training system again.	
	CITUT24 (CITUT34): I would use this online training system again	

Designing the Questionnaire

We prepared the questionnaires (both in English and Arabic), and ensured the translation is valid. All survey items, originally published in English, were translated and back-translated following established procedures (Lowry et al., 2015) by a researcher who is fluent in both English and Arabic. The two questionnaires include two situations: The first one is used during pre-adoption at time t1 (i.e. before students use the online training system), the second one is used during post-adoption at time t_2 (i.e., when students complete the simple true/false online exam), and finally at time t_3 (after they conducted a complex task during the lab exam time, which consists to design a database design using MS Access and create forms, queries, and report). And the questionnaire for the third situation at t_3 was the same to collect data at t_2.

The questionnaires were designed to capture three distinct situations: pre-adoption (time $t_{1)}$ and two post-adoption conditions (time t_2 and t_3). The pre-adoption questionnaire was administered before students began using the online training system. The post-adoption questionnaire was administered twice: once after students completed a simple true/false online exam, and again after they completed a complex task during the lab exam. This complex task involved designing a database using MS Access and creating forms, queries, and reports. The same questionnaire was used for both post-adoption data collection points (t_2 and t_3).

Sample, data collection and procedure

The study was conducted among students who utilized an online training system at a leading public university in Kuwait. The system, known as eTraining (2021), is a service provided by Track Learning Solution (www.trackls.com) and has been in operation since 2011. Track Learning Solution collaborates with renowned eLearning companies such as Skillsoft (www.skillsoft.com), Dexway (www.dexway.com), and JZERO (www.jzero.com) to offer a comprehensive database of online courses. As of February 9, 2021, the system offered 5299 courses, categorized into eight groups: courses for new students (14 courses, one in Arabic and 13 in English), career development courses (74, all in English), Microsoft Office 365 (183,

all in English), Kuwait University package (28, all in English), Arabic courses for self and professional development (67, all in Arabic), business courses (465, all in English), desktop courses (1473, all in English), and IT courses (2995, all in English). The potential participants of this study included students, teaching assistants, faculty members, and employees of Kuwait University. These individuals have free access to the online training system for self-study courses, can take online exams, and earn e-certificates if they score more than 80%. However, despite these benefits, the system's usage is relatively low, given the large population of the university, which includes over 40,000 students and more than 1,600 faculty members Table 2 shows the number of active users (AU), access courses (AC), and electronic certification (EC).

Table 2: Active end-users of Kuwait University e-Training System

Month	2017			2018			2019			2020		
	AU	AC	EC	AU	AC	EC	AU	AC	EC	AU	AC	EC
January	33	153	86	69	300	128	64	159	85	253	447	239
February	25	149	58	191	788	247	257	523	329	431	843	628
Mars	3	3	2	225	653	211	353	1102	930	217	458	256
April	3	11	2	419	1287	821	556	1237	816	242	528	274
May	79	319	257	152	442	288	69	142	70	175	522	326
June	60	126	64	122	674	348	265	702	420	193	414	195
July	84	1030	971	215	749	461	367	1489	1125	119	372	229
August	45	134	105	57	144	78	35	88	38	187	390	249
September	52	120	53	108	356	190	142	231	141	401	1080	723
October	312	765	451	493	1134	716	308	677	592	396	945	718
November	72	282	211	405	1808	1464	539	1535	1194	461	2238	1992
December	38	67	30	282	981	678	259	810	489	829	8522	8279
Total	**806**	**3159**	**2290**	**2738**	**9316**	**5630**	**3214**	**8695**	**6229**	**3904**	**16759**	**14108**

This study succeeded in collecting data across three time-phases. Table 3 provides total respondents during the three phases: Before usage of the eLearning system (t_1), 3 weeks after usage of the online training and after passing an online exam that includes easy questions, mainly true/false questions (t_2), and after passing a face-to-face exam that include designing a database with tables, forms, queries and reports (t_3).

Table 3: Participants in the three phases of the study

Study/ Phase	Sample participants and time of data collections
Study 1 (Phase 1)	The first sample was collected before using the eLearning system (T1). It had 846 responses of which 658 were complete.
Study 2 (Phase 2)	The second sample was collected 3 weeks after phase 1 and after respondents completed a simple online exam (T2). It had 655 responses of which 521 were complete. We were able to match 481 completed responses with responses from previous phase based on respondent.
Study 3 (Phase 3)	The third sample was collected 1 week after phase 2 and after respondents completed a more complex exam. It had 344 responses of which 291 were complete. We were able to match 262 completed responses with responses from previous phases based on respondent.

Conclusion, Limitations and Future Work

This study provides valuable insights into the factors influencing the continued use of eLearning systems in an Arab cultural context. The proposed model, which incorporates elements such as superior influence, complementarity/substitution, and self-efficacy, offers a more comprehensive understanding of continued use behavior in eLearning environments.

However, like all research, this study is not without its limitations. First, the context of the study was specific to a particular university in Kuwait, Second, this study proposed a conceptual model with new hypotheses that require empirical testing. Third, this study focused on a specific eLearning system, and different systems may elicit different user responses. Future research could address these limitations. While we completed the data collection across the three periods, we have yet to validate the proposed model across the three periods of data collection. Future efforts will be oriented toward the validation of the research models.

In addition, we propose conducting similar studies in different cultural and institutional settings, and with different eLearning systems. Furthermore, future work could also explore other potential factors influencing eLearning system continuance, such as user personality traits or specific features of the eLearning system. By continuing to refine and expand our understanding of eLearning system use, we can better design and implement these systems to meet the needs of diverse user populations.

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