

Exploring the Role of Individual Differences on Instructors' Technology Acceptance in Online Education through a Motivational Perspective

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ABSTRACT

The present study aims to investigate the potential variables that influence the faculty members' intention to continue using online learning systems during and after the pandemic based on extended Technology Acceptance Model (TAM) and Self Determination Theory (SDT), and to study individual differences between these variables. The methodology of the study was based on survey research and causal comparative methods. Convenience sampling method was used to identify the participants of the study, who are 302 faculty members working at twelve different state universities. Explanatory and confirmatory factor analysis (EFA-CFA) were used to test the factor structure of the data collection tool and to validate the tool through examining the model fit. Descriptive statistics were used to examine the distribution of the dependent variable scores of the participants, and one-way MANOVA was used to compare the variables based on individual differences. The findings indicated that CMP had the highest mean score, followed by the constructs of SDT (competence, autonomy, relatedness). A significant difference for male participants was observed in perceived ease of use and competence variables based on gender. No significant difference was found between the variables based on academic title. The present study established that all variables except relatedness indicated a significant difference that favors instructors with high and medium level online learning experience. It was concluded that the comparison of the motivational variables based on the individual differences of the instructors, which have critical importance in online education as well as in higher education, can contribute to the establishment of effective and sustainable quality learning environments (distance or hybrid) and to the existing literature.



INTRODUCTION

Education is a domain that is fundamentally influenced by information technologies (IT). There exist various efforts towards the integration of technology in education to provide efficiency in instruction. The pace of such progress occasionally changes based on various events. The COVID-19 Pandemic was one of these events that caused a rapid shift towards the acceleration of the use of IT in education. Such necessity caused educational institutions from all levels, especially universities (Garone et al., 2019), to switch to distance education; hence, the use of IT in education reached a peak. Higher education institutions made various investments to successfully continue distance education. However, past has proven that the increase in physical facilities does not always ensure the effective use of IT in education (Tondeur, van Braak, Siddiq & Scherer, 2016). Therefore, for the investments to become beneficial, the target audience should accept and use IT (Garone et al., 2019; Yi & Hwang, 2003). The literature also emphasizes that the faculty members, as a part of the stakeholders, should have competency in the effective use of IT (El Alfy, Gomez & Ivanov, 2017; Garone et al., 2019). Thus, faculty members need to be inclined towards the use of instructional technologies.

Along with the acceptance towards the use of technology, such processes should also be rendered sustainable (Lee, 2010). Essentially, the problems related to the intention to use these systems first appear due to the experiences of ineffective use (Adele & Brangier, 2013). Yet the intention to use these systems is significant for both the initial (Abdullah & Ward, 2016) and the continued use (Lee, 2010) to ensure the anticipated effective IT integration during and after the pandemic. It is argued that identifying the factors that affect the intention to continue using these technologies would increase their use through supporting users, such as students and faculty members and system designers (Lee, 2010; Şahin, Doğan, Okur, & Şahin, 2022).

The transition from the traditional instruction to distance education during the pandemic indicated the significance of technology integration in education even more (Lowenthal, Borup, West & Archambault, 2020; Trust & Whalen, 2020). Hybrid instructional approaches during and after the pandemic are also subjects of interest. Hence, the studies that examine the factors affecting the IT acceptance of instructors during the pandemic gained importance (Ocak & Ünsal, 2021; Şahin, Doğan, İlic, & Şahin, 2021). Therefore, the causes that affect these factors are also considered important and the models towards the acceptance and use of technology stand out especially in the domain of education. Recent studies clearly demonstrated the success of such models and theories (e.g. Technology Acceptance Model, Self-Determination Theory) in explaining the users' intention and acceptance to use these technologies and their effectiveness in revealing the factors that affect the acceptance of technologies (e.g. Baber, 2021; Ho

et al., 2021; Şahin et al., 2021; Şahin et al., 2022; Şahin, Doğan, Yıldız, & Okur, 2022; Şahin & Şahin, 2022). Hence, TAM is the theory that stands out with simple and effective way of explaining technology acceptance and utilization based on motivation (Davis, 1989; King & He, 2006; Marangunic & Granic, 2015). Furthermore, TAM consistently reveals the intention to use and to continue to use technology based on extrinsic motivation by focusing on the usefulness-ease of use perceptions towards instructional technologies (Şahin et al., 2021; Şahin et al., 2022). Therefore, TAM was chosen as one of the theoretical foundations of the present study.

Another theory that stands out in explaining acceptance and use of technology based on motivation in education is the Self-Determination Theory (SDT). SDT addresses motivation through three basic psychological needs: namely competence, autonomy, and relatedness, and focuses on intrinsic motivational tendencies of individuals towards learning and development (Deci & Ryan, 2000; Ryan & Deci, 2020). SDT was therefore selected as the other theoretical basis of the study, based on the emphases on the significance of these three basic psychological needs in acceptance and use of technology, their similarity with TAM structures in terms of motivational factors (Lu, Papagiannidis & Alamanos, 2019; Şahin & Şahin, 2022; Lu, Papagiannidis & Alamanos, 2019), and due to the lack of up-to-date studies on the basic psychological needs of faculty members in the context of technology use.

Apart from these two theoretical foundations and the six structures they comprise, compatibility and satisfaction stand out as important variables in the success of online learning technologies, especially e-learning systems and distance education platforms (Navimipour & Zareie, 2015; Sahin & Sahin, 2021; Teo, 2014; Navimipour & Zareie, 2015; Teo, 2014). These two variables were also taken into consideration within the scope of the present research and were expected to deliver significant findings due to the critical role of the user's learning or instruction approach and technological compatibility on the predisposition to use and intention to continue using and the effects of this role on ensuring the satisfaction of the users (Sanchez-Prieto et al., 2019; Şahin et al., 2022; Sanchez-Prieto et al., 2019).

In literature, there are limited studies on technology acceptance focusing on faculty members (Şahin et al., 2021) and the previous research mostly focus on students, pre-service teachers and teachers, who could be defined as the other stakeholders (Baydaş, 2015; Baydaş & Yilmaz, 2018; Ursavaş, Şahin & McIlroy, 2014). There is certain need for studies that focus on the faculty members' approach towards qualified online instruction (Berniak-Wozny, Rataj & Plebanska, 2021). Furthermore, studies that examine the potential factors affecting the faculty members' acceptance and use of technology based on variables such as individual differences are also necessary for a quality online learning environment (Vlachopoulos & Makri, 2021). On the other hand, the studies on individual differences in literature consider these variables as moderators (Şahin et al., 2021; Şahin & Şahin, 2022), included solely in a model (Mailizar, Burg & Maulina, 2021), or investigated them in blended learning environments prior to compulsory online education (Padilla-Meléndez, del Aguila-Obra & Garrido-Moreno, 2013). Thus, direct causal comparison of the variables based on motivation-oriented theoretical foundations and the factors that have critical roles in online education based on the individual differences of the faculty members are expected to contribute the research domain both theoretically and practically, and to provide information to ensure the effective and continuous use of both distance and hybrid online education. In addition to this, identifying the fundamental factors for quality online education and elucidating the roles of individual differences in both online and hybrid education are expected to deliver valuable knowledge to instructional technologists, increase the success of integration design processes, and contribute the emerging body of literature and practitioners. In this regard, the aim of the study is to measure faculty members' perceptions regarding variables that influence the intention to continue using technology and to reveal how these variables differ according to individual differences.

THEORETICAL BACKGROUND

Technology Acceptance Model

The Technology Acceptance Model (TAM) was developed by Davis (1989) to further comprehend and predict technology acceptance and use. The model aims to determine the most fundamental factors of technology use. The variables, perceived usefulness (PU), perceived ease of use (PEU) and intention (INT), which were expressed as the core constructs of the model, were employed in the present study. PEU was expressed as the individual's degree of belief on how little effort the use of IT requires. PU, on the other hand, was defined as the level of belief for the increase in performance an individual achieves by using IT. An individual's behavioral intention to use IT was also used to describe INT (Davis, Bagozzi & Warshaw, 1989). Since the present study focused on examination of instructors' intention to continue using online instructional technologies, the intention variable was adopted as the intention to continue. TAM is among the most preferred models in various research due to its reliable structure (King & He, 2006; Marangunic & Granic, 2015). Therefore, it is selected as a framework in several studies in education. Furthermore, there are studies in literature, which indicated that the TAM constructs used in the present study were important variables that affected the acceptance and use of technology in education (Baydaş, 2015; Baydaş & Göktaş, 2017; Chang, Hajiyev & Su, 2017; Şahin, 2021; Tarhini, Hone & Liu, 2014). Similarly, other studies that concentrate on faculty members have also discovered comparable emphases on the effects of perceived ease of use and perceived usefulness regarding behavioral intention (Fathema, Shannon & Ross, 2015; Wang & Wang, 2009).

Self-Determination Theory

SDT is a human development theory that focuses on the tendencies of individuals' intrinsic motivations for learning and development and how these predispositions can be supported (Ryan & Deci, 2020). This theory has important implications for education and is widely accepted in education research based on motivation (Ryan & Deci, 2000a; 2020). According to the theory, individuals have a tendency to learn, master, and interact with others (Ryan & Deci, 2020). Such predispositions lead to motivations based on the psychological needs of individuals. These needs were defined as competence, autonomy and relatedness (Ryan & Deci, 2000b). Competence, one of the fundamental psychological needs, was defined as an individuals' tendency to effectively interact

with his environment in order to feel a sense of expertise while performing an activity. Autonomy was characterized as the individual's aspiration and sense of initiative to experience the feeling of choice and freedom while participating in an activity. Relatedness was emphasized as an individual's sense of belonging and connectedness (Deci & Ryan, 2000; Ryan & Deci, 2020). Given the effect of basic psychological needs in education (Ryan & Deci, 2020) and the significance of motivation to use IT (Baydaş & Yılmaz, 2018; Hashim, Tan & Rashid, 2015), it is considered essential to examine the faculty members' online technology acceptance and use based on basic psychological needs and a motivational perspective.

System Satisfaction

Satisfaction is acknowledged as a mediating variable between acceptance and continued use. This assumption was based on the interpretation that an individual's intention to continue using the system stems from the satisfaction with their initial experience with that system (Bhattacharjee, 2001). The issue that should be emphasized here is that the satisfaction explains the process between the first use and the intention to continue. In literature, several research suggested that individuals tend to use or not to use technologies due to their satisfaction level (Cheok & Wong, 2015), and satisfaction was emphasized as one of the most important factors in the success of system integration (Teo, 2014). Moreover, there are studies that addressed satisfaction along with both TAM and SDT constructs (e.g. Jeong & Lee, 2012; Roca, Chiu & Martínez, 2006). Hence, in the present study, it was anticipated that evaluating satisfaction as a factor that influences faculty members' technology use could have the potential to provide information to improve the quality of both online and hybrid education, given that satisfaction has a critical role in motivation, which was accepted significant for successful integration processes.

System Compatibility (S-COMP)

S-COMP is defined as the degree of an individual's perception that the target technology is suitable for their task (Venkatesh & Davis, 2000). Conceptually, S-COMP aims to focus on the compatibility between the technology used in education and the method preferred by the instructor. Hence, it is possible to state that the suitability of a system can be an obstacle in technology integration in education (Sánchez-Prieto, Hernández-García, García-Peñalvo, Chaparro-Peláez & Olmos-Migueláñez, 2019). Overcoming such obstacle leads to achieved adaptation, thus technology is considered more useful and the tendency to use it increases (Rogers, 1995; Ursavaş, 2014; Ursavaş et al., 2014). Furthermore, literature suggests taking S-COMP into account together with the core constructs of TAM and SDT (Sánchez-Prieto et al., 2019; Şahin & Şahin, 2021; Şahin et al., 2021; Şahin et al., 2022; Şahin & Şahin, 2022; Ursavaş, 2014). Hence, the online instruction system could meet expectations and have the potential to assist instructors in adapting the system to their instruction approach, ensuring motivation and continued use.

Individual Differences

Gender

Gender is considered to be significant within the scope of attitude towards IT use (Chung, Park, Wang, Fulk & McLaughlin, 2010; King & He, 2006; Tarhini et al., 2014; Venkatesh, Morris, Davis & Davis, 2003; Wang et al., 2009). In online learning environments, instructor's attitude and behavior can be directly affected by the gender variable (Baron & Hård af Segerstad, 2010; Hijazi-Omari & Ribak, 2008). McKnight-Tutein and Thackaberry (2011) suggested that the differentiation in terms of gender stemmed from the fact that male and female individuals used diverse means of working in online learning environments. Literature also suggests that variables such as usefulness, ease of use and intention differ based on gender (Dundar & Akcayır, 2014; Lu et al., 2019; Ong & Lai, 2006; Sánchez-Franco, 2006; Şahin & Şahin, 2022; Teo & Noyes, 2014; Venkatesh & Morris, 2000; Venkatesh et al., 2003). A research based on faculty members determined the effect of gender as a moderator (Şahin et al., 2021). Furthermore, it was emphasized that there was a need for the detailed examination of TAM factors within the scope of gender.

Academic Title

Age is considered as one of the important regulators in terms of acceptance, adoption and intention (Chung et al., 2010; King & He, 2006; Tarhini et al., 2014; Venkatesh et al., 2003; Wang, Wu & Wang, 2009). Studies conducted with faculty members indicated that age and experience had an effect, yet were moderator variables (Şahin et al., 2021). Academic title is also related to age and experience. According to Liu (2011) academic title is one of the foremost elements in online teaching. Berniak-Wozny, Rataj, and Plebanska (2021) argued that the quality perceived by the learners' increases as the academic title decreases. Specifically, in a study that focused on the effects of academic title in online learning environments during the pandemic (Kurudirek & Kurudirek, 2021), it was found that acceptance, perceived usefulness and attitude towards technology differed based on academic title. The findings suggested a requirement for studies that encompassed a comprehensive examination of variables during online education to explore whether TAM constructs also vary based on this variable (Şahin et al., 2021).

Online Education Experience

Experience is described as the collection of particular actions of an individual (Abbasi, Chandio, Soomro & Shah, 2011). Bandura (1977) stated that experience had a strong influence on expectation, intention, and behavior. Several research in literature emphasized the role of this variable in the use of technology (Abdullah & Ward, 2016; Venkatesh & Morris, 2000). Similarly, the relationship of experience with the TAM constructs was considered as a moderator (Tarhini et al., 2014; Venkatesh et al., 2003). Experience plays a vital role in adapting to e-learning systems (Al-alak & Alnawas, 2011). It was stated that experience was important for effective online learning environments (Vlachopoulos & Makri, 2021). In literature, the relationships between usefulness, ease of use and intention factors may differ based on experience (Lu et al., 2019). Jan (2015) indicated that there was a relationship between satisfaction and experience in online learning environments. In the literature on e-learning, it is stated that experience positively affected individuals' perception of ease of use (Abdullah & Ward, 2016; Armenteros, Liaw, Fernandez, Diaz

& Sanchez., 2013; Chang et al., 2017; De Smet, Bourgonjon, De Wever, Schellens & Valcke, 2012; Tarhini, Hassouna, Abbasi & Orozco, 2015) and benefit from the technologies (Abdullah, Ward & Ahmed, 2016; Chang et al., 2017; Liu, Chen, Sun, Wible & Kuo, 2010). However, a recent study conducted during the pandemic reached contradictory findings (Mailizar et al., 2021). In studies conducted specifically for faculty members, it was found that the experience in online education had a regulatory effect (Şahin et al., 2021). Given such scope, it was considered that experience could have an impact, especially in terms of ease of use and intention. Therefore, the present study considered it valuable to examine the variables based on experience in online education.

METHOD

Research Design

The present study employed survey research and causal comparative method from quantitative research approaches. Survey research is used to identify the characteristics of the participants based a topic or event (determining the distributions of dependent variables), whereas causal comparison research aims to determine the causes of an existing situation between groups, the variables that affect these causes or the consequences of an effect (comparing dependent variables based on gender, title and online education experience) (Büyüköztürk, Kilic Cakmak, Akgun, Karadeniz & Demirel, 2013; Fraenkel, Wallen & Hyun, 2012).

Participants

Convenience sampling method was used to identify the participants of the study, who are the 302 faculty members working at various universities. The demographic information of the participants is presented in Table 1.

Table 1. Profile of the participants

		<i>f</i>	%
Gender	Female	148	49.0
	Male	154	51.0
Academic title	Research Assistant	81	26.8
	Lecturer	85	28.1
	Assistant Professor	67	22.2
	Associate Professor	47	15.6
	Professor	22	7.3
Online education experience	Low	36	11.9
	Moderate	84	27.8
	High	182	60.3
	Total	302	100.0

Table 1 indicates that approximately half of the 302 faculty members are male (n=154). Lecturers constitute the largest part of the participants (n=85, %28.1). The lowest number of participants by academic title is professors with 7.3%. More than half of the participants considered themselves experienced in online education (n=182). It has been clearly stated that participation is entirely voluntary.

Data Collection

Data was collected during the spring semester of the 2021-2022 academic year using an online form. A single measurement tool was used within the scope of the present study and it consisted of two parts. The first part included questions on demographic characteristics (age, gender, etc.) and technology competencies. The second part included 26 items with 5-point Likert-type scale (1=strongly disagree, 5=strongly agree), to measure the variables of the study. These items were intended to effectively measure the selected variables based on the theoretical foundations of the study. Hence, the items related to the six factors were adopted from the measurement tools using the same theoretical framework and the items related to the 2 factors were derived based on a detailed literature review. Items related to perceived usefulness, perceived ease of use, intention to continue using, competence, relatedness, and autonomy were adapted from Şahin and Şahin (2022) and Şahin (2021). The items related to system compatibility and system satisfaction were derived from relevant literature (e.g., Şahin et al., 2021; Şahin et al., 2022; Şahin & Şahin, 2022; Teo, 2014; Ursavaş, 2014).

Ethics committee approval was received for this study from Pamukkale University (Sosyal ve Beşeri Bilimler Araştırma ve Yayın Etiği Kurulu, 06.12.2022 and E-93803232-622.02-298095).

Data Analysis

SPSS 23 and AMOS 21 programs were used in the analysis of the data. Initially, an exploratory factor analysis – EFA was conducted on system compatibility and system satisfaction factors, which were intended to measure the compatibility between the online education technologies (e-learning system, distance education platform, etc.) and the expectations of the faculty members and their satisfaction. The factor structure was determined via EFA based on the data from 80 faculty members and the factor structure of the tool was tested. The analysis was performed with the maximum likelihood subtraction method and varimax rotation indicated that the KMO test yielded the value of 0.809 and the Bartlett sphericity test result was significant (p>0.05). Therefore, sample size for EFA was considered sufficient.

EFA results indicated that all items for S-COMP and STFN factors did not show any overlap and all were loaded under relevant factors. The item loadings were in the range of 0.556-0.935 and the total variance explained was 62.337%. Furthermore, Cronbach's alpha (α) values were found as $\alpha=0.771$ for S-COMP and $\alpha=0.852$ for STFN. Thus, it was concluded that the items for system compatibility and system satisfaction were capable of determining the latent variables that were to be measured.

Confirmatory factor analysis – CFA was also performed to verify the factor structure of the measurement tool, which consisted of items to determine variables affecting the online education technology use of the faculty members, and to test the compatibility of the scale with the data set. Reliability was evaluated by the α , CR and the degrees of explaining the variance regarding the indicators of latent constructs were tested with the AVE. The results of the analysis indicated that the α , CR and AVE values were within the accepted ranges (>0.70 and >0.50) in literature (Fornell & Larcker, 1981; Hair, Ringle & Sarstedt, 2011; Nunnally, 1978) and are presented in Table 2.

Table 2. Convergent validity

Constructs	Items	Loadings	α	CR	AVE
Perceived Usefulness	PU1	0.926	0.913	0.915	0.732
	PU2	0.923			
	PU3	0.847			
	PU4	0.807			
Perceived Ease of Use	PEU2	0.728	0.733	0.812	0.686
	PEU3	0.918			
Competence	CMP1	0.913	0.948	0.948	0.860
	CMP2	0.949			
	CMP3	0.920			
Relatedness	RLTD1	0.753	0.844	0.847	0.584
	RLTD2	0.863			
	RLTD3	0.788			
	RLTD4	0.635			
Autonomy	AUT1	0.954	0.790	0.754	0.522
	AUT2	0.617			
	AUT3	0.625			
System Compatibility	S-COMP1	0.811	0.829	0.849	0.657
	S-COMP2	0.935			
	S-COMP3	0.662			
System Satisfaction	STFN1	0.855	0.878	0.881	0.712
	STFN2	0.883			
	STFN3	0.791			
Continuance Intention	CI1	0.719	0.900	0.910	0.775
	CI2	0.953			
	CI3	0.949			

Based on the analysis results, it was determined that the item loadings of the factors were between 0.617 and 0.954 (>0.6) except PEU1. Therefore, PEU1 was excluded from the measurement tool due to low item loadings. It was concluded that the scale was reliable at item level. Cronbach's alpha (α) and composite reliability values were identified between 0.733-0.948 and 0.754-0.948 (>0.7), thus the two criteria ensured the reliability of the scale. Finally, average variance extracted values obtained for the factors were found to be between 0.522 and 0.860 (>0.5), which suggested that the dimensions of the scale measured the variables effectively (Hair et al., 2011; Hair, Hult, Ringle & Sarstedt, 2017). In the context of construct validity, discriminant validity was also tested. The values in Table 3 indicate that the constructs in the measurement tool was not highly correlated to each other and discriminant validity was achieved. The results of the CFA are presented in Figure 1.

Table 3. Discriminant Validity

Factors	PU	PEU	CMP	RLTD	AUT	S-COMP	STFN	CI
PU	0.856							
PEU	0.296	0.828						
CMP	0.262	0.769	0.927					
RLTD	0.286	0.169	0.158	0.764				
AUT	0.302	0.533	0.719	0.299	0.723			
S-COMP	0.322	0.282	0.248	0.583	0.347	0.811		
STFN	0.687	0.352	0.413	0.151	0.325	0.266	0.844	
CI	0.561	0.362	0.381	0.317	0.360	0.391	0.504	0.880

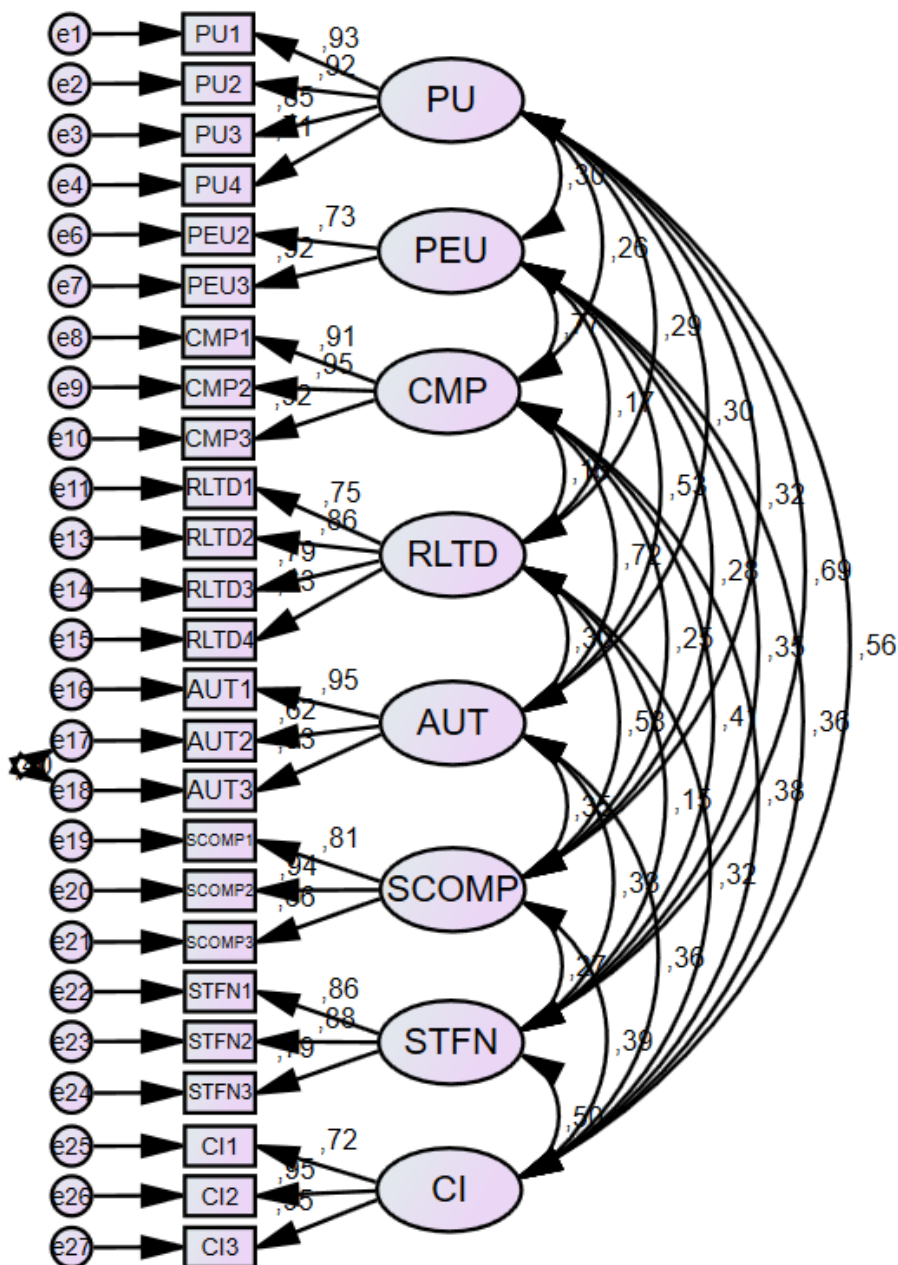


Figure 1. CFA results

The fit of the model was also tested with CFA. NFI (normed fit index), TLI (Tucker-Lewis index), CFI (comparative fit index), χ^2/sd , SRMR (standardized root mean square residual) and RMSEA (root mean square error of approximation) values indicated in literature were used to test the fit of the model.

Table 4. Fit indexes and CFA values

Fit indexes	Good fit value	Fit value	Literature	Result
χ^2/sd	$0 \leq \chi^2/sd \leq 5$	2.133	Sümer (2000)	Excellent
SRMR	$0 \leq SRMR \leq 0.05$	0.066	Kline (2011)	Acceptable
RMSEA	$0 \leq RMSEA \leq 0.06$	0.06	Thompson (2004)	Excellent
NFI	$0.95 \leq NFI \leq 1$	0.911	Thompson (2004)	Acceptable
TLI	$0.90 \leq TLI \leq 1$	0.939	Schumacker and Lomax (1996)	Excellent
CFI	$0.95 \leq CFI \leq 1$	0.951	Hu and Bentler (1999)	Excellent

The analysis results presented in Table 4 indicated that the fit of the model was ideal with appropriate values ($\chi^2/sd=2.133$, $RMSEA=0.06$, $SRMR=0.066$, $NFI=0.911$, $TLI=0.939$, $CFI=0.951$). The results suggested that the fit of the model was very good. CFA findings indicated that the construct validity of the scale was ensured and the factor structure was confirmed. Therefore, it is

possible to state that the measurement tool could be used to examine the variables on the use of online education technologies by the faculty members.

Descriptive statistics was used to examine the distribution of faculty members' dependent variable scores and one-way MANOVA was used to compare the dependent variables based on gender, academic title and online education experience.

RESULTS

Mean and standard deviation values were analyzed to determine the PU, PEU, S-COMP, RLTD, CMP, AUT, STFN and CI scores of the participants (Table 5).

Table 5. Score distributions for dependent variables

Dependent Variable	n	M	SD
PU	302	2.53	.885
PEU	302	3.24	.933
S-COMP	302	2.43	.981
RLTD	302	3.74	.762
CMP	302	4.20	.790
AUT	302	4.18	.608
STFN	302	2.65	.959
CI	302	3.09	1.049

In Table 5, the highest mean score was identified in the CMP variable ($\bar{x}=4.20$). It was followed by AUT ($\bar{x}=4.18$), RLTD ($\bar{x}=3.74$), PEU ($\bar{x}=3.24$), CI ($\bar{x}=3.09$), STFN ($\bar{x}=2.65$), PU ($\bar{x}=2.53$) and S-COMP ($\bar{x}=2.43$), respectively.

First, the assumptions were examined in one-way MANOVA, which was performed to determine how the dependent variable scores of the faculty members differed based on gender, academic title and online education experience. Of the prerequisites, the homogeneity of the variance-covariance matrices was not met. Box's Covariance Matrix Equation Test were examined ($p<.05$) to check this prerequisite. Tabachnick and Fidell (2012) indicated that Pillai's Trace method was more suitable for MANOVA analysis when variance-covariance homogeneity was not met. Therefore, Pillai's Trace value was chosen to interpret the values obtained from MANOVA. All other assumptions required by MANOVA were met. The skewness and kurtosis values calculated for the distribution of dependent variables are between -1 and +1, which is the acceptable normal distribution assumption limits specified by Huck (2012). In addition, Mahalanobis value, which is one of the standard scores, was examined in the process of removing the extreme values of the data set and ensuring the multivariate normal distribution. Since the critical value for Mahalanobis distance is 26.124 (eight dependent variables), data higher than this value were determined as extreme values and were excluded from the data set. In addition, there is a positive, close to medium-sized significant relationship between the dependent variables ($r<.80$). The high correlation between the dependent variables included in MANOVA creates a singularity problem. It is ideal for MANOVA that the relationship between dependent variables is around the middle level (Pallant, 2007). All these preliminary findings show that the data set provides the necessary prerequisites to perform MANOVA. The results of the MANOVA are presented in Table 6.

Table 6. The differentiation status of dependent variables

Independent Variable	Pillai's Trace	F	Hypothesis sd	Error sd	p	η^2	Power
Gender	.145	6.223	8	293.000	.000	.145	1.000
Academic title	.218	2.109	32	1172.000	.000	.054	1.000
Online education exp.	.387	8.780	16	586.000	.000	.193	1.000

Table 6 indicates that the PU, PEU, S-COMP, RLTD, CMP, AUT, STFN and CI levels of the faculty members were significantly different for gender (Pillai's Trace=.145, $F(8,293)=6.223$, $\eta^2=.145$, $p<.017$), academic title (Pillai's Trace=.218, $F(32,1172)=2.109$, $\eta^2=.054$, $p<.017$) and online education experience (Pillai's Trace=.387, $F(16,586)=8.780$, $\eta^2=.193$, $p<.017$).

The effect size of the three independent variables indicated that the sample size was sufficient to make relevant comparisons. Furthermore, it was observed that the effect size of academic title was small ($\eta^2<.06$), whereas gender and online education experience had higher effect sizes ($\eta^2>.14$) (Cohen, 1988). ANOVA results were examined to determine which dependent variable caused the significant difference based on MANOVA result (Table 7). In addition, Bonferroni correction was made to prevent the first type of error and the significance level was determined as .00625 (.05 / 8) because eight statistical operations were performed on the same data set.

Table 7. ANOVA results

Independent variable	Dependent variable	SS	sd	MS	F	p	η^2	Power
Gender	PU	2.994	1	2.994	3.857	.050	.013	.499
	PEU	20.804	1	20.804	25.872	.000*	.079	.999
	S-COMP	6.438	1	6.438	6.821	.009*	.022	.740
	RLTD	.896	1	.896	1.546	.215	.005	.236
	CMP	6.265	1	6.265	10.347	.001*	.033	.894
	AUT	.075	1	.075	.203	.652	.001	.073
	STFN	1.006	1	1.006	1.094	.296	.004	.181
	CI	1.086	1	1.086	.987	.321	.003	.168
Academic title	PU	2.478	4	.619	.788	.534	.011	.252
	PEU	5.887	4	1.472	1.706	.149	.022	.521
	S-COMP	6.727	4	1.682	1.766	.136	.023	.537
	RLTD	2.944	4	.736	1.272	.281	.017	.397
	CMP	5.406	4	1.352	2.200	.069	.029	.644
	AUT	3.198	4	.800	2.194	.070	.029	.643
	STFN	6.263	4	1.566	1.719	.146	.023	.524
	CI	.766	4	.191	.172	.953	.002	.086
Online education experience	PU	9.574	2	4.787	6.324	.002*	.041	.897
	PEU	49.937	2	24.969	35.198	.000*	.191	1.000
	S-COMP	10.606	2	5.303	5.684	.004*	.037	.861
	RLTD	.006	2	.003	.006	.994	.000	.051
	CMP	57.933	2	28.966	66.640	.000*	.308	1.000
	AUT	7.421	2	3.710	10.669	.000*	.067	.989
	STFN	26.143	2	13.072	15.592	.000*	.094	.999
	CI	22.225	2	11.113	10.755	.000*	.067	.990

* Significant differences.

According to Table 7, PEU ($F_{PEU}(1,300) = 25.872, p < .00625$) and CMP ($F_{CMP}(1,300) = 10.347, p < .00625$) differed significantly by gender. On the other hand, all variables except RLTD ($F_{RLTD}(2,299) = .006, p > .00625$) construct differed according to online education experience. However, none of the variables differed by academic title.

The effect size of the differentiation seen in PEU and CMP ($\eta^2 > .14$) constructs according to online education experience is high, moderate for AUT, STFN and CI ($.06 < \eta^2 < .14$) constructs, and low for PU and S-COMP constructs ($\eta^2 < .06$). Multiple comparison tests were used to determine the groups of independent variables with significant difference and the results are presented in Table 8.

Table 8. Multiple comparison tests

Dependent Variable	(I) Gender	(J) Gender	$\Delta\bar{x}_{(I-J)}$	SE	p
PEU	Female	Male	-.525*	.103	.000
S-COMP	Female	Male	-.292	.112	.000
CMP	Female	Male	-.288	.090	.001
	(I) Online education experience	(J) Online education experience	$\Delta\bar{x}_{(I-J)}$	Sh	p
PU	High	Low	.449	.159	.015
PEU	High	Low	1.222	.154	.000
	Moderate	Low	.731	.168	.000
S-COMP	High	Low	.585	.176	.003
CMP	High	Low	1.190	.120	.000
		Moderate	.700	.087	.000

	Moderate	Low	.491	.131	.001
AUT	High	Low	.384	.108	.001
		Moderate	.286	.078	.001
STFN	High	Low	.896	.167	.000
		Low	.752	.185	.000
CI	High	Moderate	.418	.134	.006

In Table 8, PEU, S-COMP and CMP comparison based on gender variable presented that mean scores of female faculty members were significantly lower compared to that of male faculty members. Comparison based on online education experience showed that the difference between low-experienced and high-experienced groups was significant for all dependent variables in favor of high-experienced groups. Furthermore, the high-experienced groups had higher means of CMP, AUT, and CI than the moderately-experienced groups. Finally, moderately-experienced groups had higher mean values for PEU and CMP when compared to low-experienced groups.

DISCUSSION

The present study intended to examine the faculty members' acceptance of and continuance to using online learning systems, within the scope of extended TAM theoretical framework based on gender, academic title and online learning experience, during and after the pandemic. 302 faculty members, who experienced the online education process in several universities, participated in the study. It was considered that the results based on individual differences could be beneficial in ensuring effective and quality use of online learning systems, for both distance and hybrid approaches.

Among the variables, CMP had the highest mean score, followed by AUT, RLTD, PEU, CI, STFN, PU, and S-COMP, respectively. Such finding indicated that the faculty members with high CMP scores had a high belief in their knowledge and skills on online technologies, hence self-confidence in online technologies was considered more decisive compared to other variables. Other studies, which concluded that a stronger relationship between CMP and IT use intention affected technology acceptance processes more compared to other different external variables (Şahin, 2021; Şahin & Şahin, 2022), supported this finding. The findings for AUT and RLTD, which ranked in the first three and represent the other two dimensions of SDT, suggested that the freedom to choose online technologies and teaching methods and being able to use initiative were considered a priority by faculty members. The emphases on the critical motivational role of basic psychological needs, such as autonomy and relatedness, on the intention to continue using IT (Lu et al., 2019; Şahin, 2021) indicated that the findings of the present study were aligned with findings in literature. The results of the core TAM variables revealed that these factors were not considered as a priority by the faculty members in online instruction. Such findings were considered unexpected for PU and PEU, which were expected to be the highly determining factors for the intention to use technology (Venkatesh & Davis, 2000). However, when technology use is not a choice but an essentiality, as during the pandemic, the performance increase that the faculty members obtained from technology and the level of effort required for effective use of technologies might no longer act as determining factors as stated in literature (Şahin et al., 2021), thus this argument is in parallel with the finding obtained in the present study. On the other hand, the findings for STFN and S-COMP factors were also unexpected. The results suggested that the faculty members' expectations on the technologies they used, such as e-learning systems and distance education platforms, were not met and their satisfaction levels were low accordingly. The findings based on autonomy indicated that the nature of compulsory online education was a determining factor in the results based on satisfaction and compatibility, since faculty members attached strong significance to the freedom to choose the teaching technology and method.

The findings indicated that PEU, CMP and S-COMP factors differed based on gender. The difference was in favor of male faculty members for all factors. Male instructors primarily evaluated the level of effort required for the effective use of online technologies, had a higher belief in their knowledge and skills in online technologies, and considered technology as a more decisive factor in meeting their expectations towards teaching. Considering that the relationship between PEU and intention was stronger for male faculty members and that they had higher PEU levels, it is possible to state that the results were aligned with previous studies (Baron & Hård af Segerstad, 2010; Dundar & Akcayır, 2014; Hijazi-Omari & Ribak, 2008; Lu et al., 2019; Ong & Lai, 2006; Sánchez-Franco, 2006; Şahin & Şahin, 2022; Teo & Noyes, 2014; Venkatesh & Morris, 2000; Venkatesh et al., 2003). On the other hand, the findings for S-COMP can be considered natural, based on the connection between the perception of ease of use and the expectations for compatibility (Khan, Parvaiz, Bashir, Imtiaz & Bae, 2022; Sahin & Sahin, 2021; Şahin et al., 2021). CMP was defined as an individual's intention to interact effectively with his/her environment to feel a sense of expertise while performing an activity (Ryan & Deci, 2000b). Higher scores obtained by male faculty members might therefore be related to the fact that these individuals had an increased level of interaction in the online learning environment due to their greater drive towards specialization. The difference between working approaches in online learning environments preferred by females and males can also be associated with above discussion (McKnight-Tutein & Thackaberry, 2011). On the other hand, it was determined that the other dependent variables PU, RLTD, AUT, STFN, S-COMP and CI did not differ based on gender. The finding for PU was parallel to few studies in literature that did not find a difference between perceived usefulness and intention based on gender (Baydas, & Goktas, 2016; Teo, 2008). Besides, the findings related to PU and CI contrast largely with literature which indicated that the relationship between these variables might differ based on gender (Baron & Hård af Segerstad, 2010; Dundar & Akcayır, 2014; Hijazi-Omari & Ribak, 2008; Lu et al., 2019; Ong & Lai, 2006; Sánchez-Franco, 2006; Şahin & Şahin, 2022; Teo & Noyes, 2014; Venkatesh & Morris, 2000; Venkatesh et al., 2003). The result of PU demonstrated that male and female faculty members had similar perceptions on

increased performance that can be achieved through the use of online technologies. AUT is an individual's sense of initiative to experience the sense of freedom while performing an activity (Deci & Ryan, 2000; Ryan & Deci, 2020). The results of the present study demonstrated that the faculty members had similar opinions on both technology and teaching approaches in online environments, regardless of gender, and freedom of choice was a factor for both gender groups. The motivational variable, RLTD emphasizes the individual's sense of belonging and connectedness (Deci & Ryan, 2000; Ryan & Deci, 2020). The findings of RLTD suggested that both female and male instructors considered themselves as a part of an academic group in online learning environments and encountered no problems in terms of professional acceptance. There was no difference between the STFV scores based on gender and this finding was in line with literature which indicated that male and female faculty members had similar satisfaction levels with online technologies such as e-learning systems and distance education platforms (Bayrak, Tıbı & Altun 2020; Harvey, Parahoo & Santally, 2017; İlic, 2021; Bayrak, Tıbı & Altun 2020; Harvey, Parahoo & Santally, 2017). However, this result was also in contrast with the studies in the literature that favor of female (Gonzalez-Gomez, Guardiola, Rodriguez & Alonso, 2012) or male (Xu & Wang, 2006) participants. It was argued that STFV variable was associated with AUT (Jeong & Lee, 2012; Vansteenkiste, Zhou, Lens & Soenens, 2005) and CI (Taghizadeh et al. 2021). In other words, instructors with autonomous motivation required higher satisfaction with the system to use and continue using the systems. The difference based on gender, which was not found for AUT and CI, could be supported as a result of the above argument.

The findings of the present study yielded no significant difference between any of the variables based on academic title. The faculty members with different titles had similar beliefs towards the increased performance they would obtain due to the intention to use and continue using online technologies and the effort required for the effective use of these technologies. Furthermore, the results suggested that academic title did not make a difference in trust in knowledge and skills in online technologies, professional acceptance, sense of initiative in teaching processes, satisfaction with the technologies used, and the level of meeting the faculty members' expectations with online technologies. However, there exist examples in literature that partly contradict these findings (Kurudirek & Kurudirek, 2021). In a related study, it was found that general acceptance, perceived usefulness and attitude differ based on academic title during the pandemic. In another study, it was stated that the quality perceived by the learners decreased as the academic title increased (Berniak-Wozny et al., 2021). It was considered that this finding could be based on the age of the instructor, hence the problems experienced by elderly instructors in online learning might lead to such perception in learners. The direct relationship between age and academic title supports this claim. However, the results suggest disparities between the study's findings and the existing literature concerning certain variables.

All variables except RLTD had significant differences based on online education experience. The difference favored high-experienced and moderately-experienced faculty members. The effects of PU and PEU on intention were found to differ based on experience (Abdullah & Ward, 2016; Abdullah et al., 2016; Armenteros et al., 2013; Chang et al., 2017; De Smet et al., 2012; Liu et al., 2010; Lu et al., 2019; Tarhini et al., 2015). It was considered natural that the perception of ease of use increased due to the increased online teaching experience of faculty members. Another variable, S-COMP, was defined as the degree of an individual's perception that the target technology is suitable for his/her task (Venkatesh & Davis, 2000). It was considered that instructors found online learning systems more suitable for their tasks as their experience increased. CMP and AUT, variables within the scope of motivation, were better scored for high-experienced faculty members compared to moderately-experienced. SDT argued that individuals have the need to learn, master and connect with other individuals (Ryan & Deci, 2020). CMP is the factor that is related with a faculty member's intention to effectively interact with the environment in order to demonstrate expertise in an online activity. It was considered natural that increased experience led to increased scores for this variable. AUT, on the other hand, refers to the perception of freedom to choose during an activity in which they are involved. Given the flexibility of online environments, individuals with higher AUT scores are the ones with higher online experience. RLTD was found to be the only variable that did not differ based on experience. This motivation element emphasizes the individual's sense of belonging and connectedness (Deci & Ryan, 2000; Ryan & Deci, 2020). It was considered that those with more experience had a higher sense of belonging to the relevant environment. The fact that each instructor became more accustomed to the online environment during the long-lasting pandemic could be effective in achieving this result. Furthermore, STFV was found to be affected by previous experiences in literature (Ferrer, Ringer, Saville, Parris & Kashi, 2022; Jan, 2015; Kovačević, Labrović, Petrović & Kužet, 2021). In the same vein, this study demonstrated that experienced academics engaged in online learning environments exhibited greater satisfaction with the system. Another variable that differed based on experience was CI. The intention to use the system was stated to be associated with STFV (Taghizadeh et al., 2021). Therefore, it was observed that the instructors who were satisfied with the process and were more experienced preferred to continue the online education more.

CONCLUSION AND RECOMMENDATIONS

The present study examined the potential variables that affected the faculty members' intention to continue using online learning systems and these variables were analyzed based on individual differences of the faculty members. One of the primary contributions of the study is that the current number of researches focusing on individual differences in the use of online educational technologies is very scarce, and furthermore, the number of current studies specifically targeting academics in this context is even more limited. In this regard, it is anticipated that the study helps fill a gap in the field. Another important contribution of the study is the findings depicting the constructs used in the research based on academics' individual differences. In other words, the findings provide an idea of how academics prioritize different factors according to their individual differences. The key takeaway from this is the evidence suggesting the significant potential of individual differences, particularly as moderator variables. In this respect, it can be interpreted that these pieces of evidence provide valuable data for future studies, guiding both theoretically and practically in terms of incorporating individual differences.

The variables analyzed to assess the intention to continue using online technologies showed that CMP obtained the highest mean score, followed by AUT, RLTD, PEU, CI, STFN, PU, and S-COMP, in that order. This is one of the most prominent findings of the present study. It was noteworthy that SDT structures were distinctly more influential on the instructors' intention to continue using online technologies compared to other factors. This finding suggests that the basic psychological needs (competence, autonomy, relatedness) play a crucial role for faculty members in utilizing technology for education. It highlights the importance of considering related factors by instructional designers, instructional technologists, and policy makers during integration processes. It was revealed that online technologies should be suitable for the expertise of instructors, should be flexible enough to allow customization, and facilitate professional interaction through their design. Furthermore, taking the motivational factors of SDT into account before the use of instructional technologies have the potential to make significant contributions to the effective and efficient use of technology in education. Findings related to core TAM constructs were critical findings of the present study as well. The results indicated that the faculty members did not consider the potential performance increase introduced by online technologies sufficient and the effort required for the effective use of these technologies was higher than they expected. Such outcome can be considered critical since perceptions of usefulness and ease of use in technology acceptance are essential factors (Venkatesh & Davis, 2000). Perceiving online technologies in education as a performance-enhancing factor and as a tool that does not require much effort for successful use has a vital role at this point both for instructors and learners. Thus, it is of great importance for both online and hybrid education to employ technologies with a user-friendly design that do not require extensive efforts, enable faculty members to provide higher quality education and increase student success.

The causal comparison based on individual differences indicated that male faculty members had higher scores compared to females for PEU, CMP and S-COMP. The variables PU, RLTD, AUT, STFN and CI did not exhibit significant difference based on gender. Changes in technology acceptance based on gender is a topic that was largely studied. Despite the commonly accepted findings, basic factors such as the type of technology and the nature of the utilized environment rendered it difficult to reach certain conclusions. The results of the present study demonstrated a similar structure. Hence, both theoretical and applied further studies are essential on the subject. The results of the present study emphasized both the necessity of examining the factors that affected the acceptance and use of instructional technologies based on gender (Lu et al., 2019; Şahin et al., 2021; Lu et al., 2019) and the inadequacy of the number of studies that focused on instructors, thus pointed out a significant research gap in emerging literature.

A significant discovery in the present study is that nearly all variables (except RLTD) differed based on the participants' experience with online education. Thus, faculty members' experience on online technologies should be considered as one of the most basic factors. In other words, acquiring comprehensive information about the competencies and expertise of the instructors and further developing these skills plays a crucial role in delivering the desired outcomes through online technologies in higher education. Hence, self-efficacy perceptions of faculty members on instructional technologies and their knowledge and skill levels are of great importance in terms of appropriately and consistently designing both online and hybrid education and the success of the integration processes.

The findings based on academic title were noteworthy as well. There was no significant difference between any of the variables based on academic title. Given the relationship between academic title and specialization, it was concluded that the results were relatively unanticipated. Yet, academic title was a rather less studied independent variable in literature and previous studies did not provide sufficient findings. Thus, no certain judgment could be delivered based on the findings of the present study. It should therefore be noted that academic title should be investigated more as a factor through comprehensive research. Academic title is expected to have an important role in ensuring the quality of integration between higher education and the effective use of technology.

Appropriate skills and experience are essential to improve the quality of online education, whether distance or hybrid. Therefore, employing suitable pedagogical methods (e.g blended learning, flipped learning) becomes significant (Huang et al., 2020). It is also a necessity for all stakeholders to be involved in the process of cooperation and sharing. The scope and findings of the present research indicated that the future studies and/or applications should consider the differences within the education process based on gender, emphasize the advantages of experience in online education and necessary steps should be based on research for future initiatives.

There are aspects that future studies can concentrate on to advance the current research further. In contrast to the causal comparison employed in this study, an alternative approach could involve comparing the relationships between variables using path modeling across multiple models. By employing multi-group analysis in this manner, more comprehensive insights can be gained into how the relationships between different constructs vary among independent variable groups, such as experience, title, and so forth. Another potential avenue for future studies could involve investigating cognitive, social, and affective needs. Analyzing these factors, which play a motivational role in the context of the acceptance and utilization of online technologies (Ebarido & Suarez, 2023; Hashim et al., 2015), with regard to individual differences among academicians, has the capacity to yield valuable data. Lastly, concerning the effective use of online technologies, motivation being a fundamental factor, and the role of innovativeness traits in this context (Kılıçer & Odabaşı, 2010; Şahin et al., 2021), academics' individual characteristics can be approached with a different perspective. In line with this, a study focusing on personality traits such as resistance to change and openness may provide significant insights and contribute to the field.

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