DETERMINANTS OF INSTRUCTIONAL TECHNOLOGY ADOPTION IN HYBRID EDUCATIONAL SETTINGS: EXPLORING INDIVIDUAL AND INSTITUTIONAL FACTORS FOR INSTRUCTORS

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Received: 08/12/2024 **Accepted:** 06/03/2025

ABSTRACT

The empirical evidence regarding the acceptance and use of hybrid education and online instructional technologies in mandatory educational contexts remains limited. Specifically, studies addressing instructors' acceptance and usage of these technologies in the context of hybrid education are even scarcer. This study aims to fill this gap by investigating the factors influencing instructors' intention to use online instructional technologies within the framework of an extended Technology Acceptance Model (TAM). The study includes 301 instructors from five different state universities who have experience in conducting both face-to-face and online courses within the hybrid education format. The research employs confirmatory factor analysis, structural equation modeling, and bootstrapping analysis for data analysis. The findings reveal that the proposed model explains 54.7% of ease of use, 53.5% of usefulness, and 65.4% of intention variance. Notably, self-efficacy and compatibility factors exhibit the most substantial influence on the outcomes. Furthermore, the findings suggest that the impact of institutional and individual factors, such as facilitating conditions, openness, and resistance to change, differ significantly in the context of mandatory hybrid education compared to conventional settings. The study discusses theoretical and practical implications and highlights potential avenues for future research.

Keywords: Instructional technologies, online education, hybrid education, instructors, technology acceptance model, path modeling.

INTRODUCTION

In the aftermath of a global pandemic that disrupted the education of over one billion students, institutions worldwide turned to hybrid education as a key strategy during the process of returning to normalcy. Hybrid education entails an instructional approach where educators combine both traditional face-to-face teaching and online methods. While there have been previous studies examining hybrid education from various angles, its most notable period of implementation occurred during the post-pandemic transition. What sets

this transitional phase apart is the obligatory nature of hybrid education, as opposed to previous research conducted in voluntary adoption environments. This distinction is critical, as the relationship between the tendency toward technology use and the variables influencing adoption processes may differ in contexts where its use is mandated (Sahin et al., 2022).

Successfully integrating instructional technologies in hybrid education requires more than just access to digital tools; it also depends on instructors' knowledge, skills, and willingness to adapt their teaching practices (Garone et al., 2019; El Alfy et al., 2017). However, the fact that the role of the instructors in online education has changed from the position of transferring knowledge in traditional education to the one who mentors the students in the effective learning path (Juan et al., 2011) and this situation does not fully overlap with the method in which most of the instructors learn to teach (Anderson et al., 2011; Orhan-Goksun, 2017) makes the process more challenging. When the necessity of using online instructional technology is added to this process, delivering a quality education that provides effective learning and raising productive students who can structure knowledge becomes an even more challenging task for instructors.

A central component of hybrid education is the integration of online instructional technologies, including e-learning systems, learning management systems, and distance education platforms. The successful adoption of these tools by faculty is not merely a technical process but a diffusion-based qualitative transformation (Porter et al., 2016). Therefore, understanding the factors that shape faculty members' tendencies and intentions to use online instructional technologies is essential for effective technology integration. In this context, technology acceptance models provide valuable theoretical and practical insights into faculty adoption behaviors. These models not only explain and predict technology use but also allow researchers to expand their frameworks by incorporating additional factors relevant to specific educational settings (Sahin, 2021).

Among these models, the Technology Acceptance Model (TAM) (Davis, 1989) has been widely utilized to investigate technology adoption in education. TAM's simplicity and empirical support make it a widely accepted framework in the field, serving as the foundation for numerous studies on technology use (King & He, 2006; Granic & Marangunic, 2019). Given its effectiveness in explaining users' acceptance of technology, TAM is particularly well-suited to examining faculty members' adoption of online instructional technologies in hybrid education. However, to better capture the complexities of technology use in mandatory hybrid education settings, this study extends TAM by incorporating additional variables that influence faculty adoption.

The significance of faculty members' acceptance and use of technology has led researchers to explore the various factors influencing effective technology integration (Ayele & Birhanie, 2018; Gunasinghe et al., 2019; Fathema et al., 2015; Lavidas et al., 2021; Mittal et al., 2022; Sahin et al., 2021). These studies have provided valuable insights that guide both faculty members in developing digital competencies and institutions in designing effective technology integration strategies. Despite these contributions, there remains a gap in research specifically addressing the intersection of hybrid education, faculty members, and the mandatory use of instructional technology (AlMaroof et al., 2021; Anthony et al., 2022).

Consequently, the primary objective of this study is to delve into the determinants influencing instructors' intentions to employ online instructional technologies within the framework of hybrid education, employing an extended Technology Acceptance Model (TAM). The aspiration is to contribute valuable insights that can facilitate effective utilization, not only in scenarios where mandatory hybrid education resurfaces but also in instances where instructors opt for hybrid education voluntarily within a conventional educational context. Additionally, this study contributes to the literature by addressing the context-specific adaptations of TAM, offering a deeper understanding of how mandatory versus voluntary adoption influences technology acceptance. Beyond theoretical contributions, this research has significant practical implications. The findings can inform institutional policies and faculty development programs, equipping universities with targeted strategies to enhance faculty adoption of online instructional technologies. Moreover, understanding the dynamics between traditional and digital pedagogical approaches can support the development of more effective blended teaching strategies. Ultimately, this study aims to bridge the existing gap in the academic literature and offer valuable insights for both researchers and practitioners seeking to optimize technology integration in hybrid education.

THEORETICAL BACKGROUND

Technology Acceptance Model

The Technology Acceptance Model (TAM) (Davis, 1989) is widely regarded as a robust and parsimonious framework for explaining technology adoption across various contexts. Grounded in the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), TAM posits that individuals' intentions to use a technology are primarily shaped by their perceptions of its usefulness and ease of use (Davis et al., 1989; Sahin et al., 2024). TAM, which is expressed as a solid and reliable theory (Venkatesh et al., 2003), has been widely accepted throughout the literature and constitutes one of the most commonly used models in the field of education (Granic & Marangunic, 2019; King & He, 2006). TAM, which has a simple and clear structure, allows model expansion studies to test the proposed model without complicating it (Bagozzi, 2007; Davis et al., 1989). TAM includes five constructs: Perceived ease of use (PEU), perceived usefulness (PU), attitude (ATT), intention (INT), and actual use (AU). However, studies in which all the components of TAM are considered together are rare. In cases where ATT and AU are included in the models, it is decisive whether the actual use of technology and the mediating effect of the attitude towards technologies are within the scope of the research (Sahin, 2021). Since this study focuses on direct effects and intention to use, the core model consists of PEU, PU and INT constructs.

PEU is expressed as the degree to which a user believes that using technology will require little effort. PU is explained as a user's belief in the improve in performance that he or she will gain from the use of technology. INT is expressed as the user's tendency to use the relevant technology (Davis, 1989). In the literature, the critical role of PEU and PU in explaining the intention to use technology has been demonstrated many times, and the relationships of PEU, PU and INT with many different external variables have been reported. (e.g Al-alak & Alnawas, 2011; Budu et al., 2018; Fearnley & Amora, 2020; Teo & Huang, 2019; Sahin et al., 2024).

In hybrid educational environments, faculty members' intentions to use instructional technologies are largely shaped by their perceptions of the technology's usefulness and ease of use. PU reflects the extent to which instructors believe that using instructional technologies enhances their teaching effectiveness, making them more likely to adopt these tools. As hybrid education demands flexibility and efficiency, faculty members who perceive instructional technologies as beneficial are more inclined to integrate them into their teaching practices, supporting the positive relationship between PU and intention. Additionally, PEU plays a crucial role in shaping both PU and intention. When faculty find instructional technologies intuitive and effortless to use, they are more likely to perceive them as useful, reinforcing their adoption. Furthermore, reduced technical complexity lowers perceived barriers to use, increasing faculty members' willingness to incorporate these technologies into hybrid instruction. Thus, both PU and PEU serve as key determinants of faculty members' adoption of instructional technologies (Fathema et al., 2015; Lavidas et al., 2021; Sahin et al., 2024). Accordingly, the following hypotheses was proposed.

H1. PU positively influences intention.

H2. PEU positively influences (a) perceived usefulness and (b) intention.

Compatibility

CMP enhances ease of use by reducing the effort needed to adopt and integrate new technologies into existing workflows. It also significantly impacts perceived usefulness by ensuring the technology aligns with users' specific needs and goals (Sanchez-Prieto et al., 2019; Sahin et al., 2021). Incompatibility between instructional technology and the instructor's preferred teaching method is a significant barrier to technology adoption. Conversely, users tend to perceive technologies that align with their personal preferences as more beneficial and are inclined to favor such technologies (Rogers, 1995; Ursavas, 2014). Therefore, compatibility (COMP), characterized as the extent to which a technology aligns with an individual's preferences and needs (Venkatesh & Davis, 2000), emerges as a pivotal factor. Instructors are more likely to integrate online instructional technologies into their teaching if they perceive them as compatible with their workflow and pedagogical beliefs. However, if these technologies require extensive adaptation or conflict with their teaching

philosophy, instructors may resist adoption, even if they acknowledge their potential benefits. In parallel, it is among the findings emphasized in previous studies that COMP affects the core structures of TAM (e.g Ursavas, 2014; Ursavas et al., 2014). With this in mind, the following hypotheses were formulated.

H3. COMP positively influences (a) perceived usefulness, (b) perceived ease of use, and (c) intention.

Self-Efficacy

Self-efficacy (SE), which is expressed as an individual's judgment of his/her capacity to fulfill a certain task, focuses on the individual's perception of what he/she can achieve with his/her skills (Bandura, 1986). Within the scope of SE, the individual's belief in being able to accomplish a task through the technology is emphasized (Compeau & Higgins, 1995). Faculty members' confidence in their ability to effectively use online education technologies—plays a critical role in shaping their perceptions of ease of use in hybrid environments. Instructors with higher self-efficacy are more likely to approach new technologies with a positive mindset, navigate digital tools more efficiently, and troubleshoot minor issues independently, reducing perceived complexity. Conversely, those with lower self-efficacy may find online technologies overwhelming, perceiving them as difficult to use. Therefore, as self-efficacy increases, faculty members are more likely to view online education technologies as intuitive and manageable, reinforcing the positive relationship between self-efficacy and perceived ease of use. Similarly, it is stated that if users have a high belief in their self-efficacy and are confident in using technology, they will perceive the use as easier and have a more positive perception of the performance increase, they will get from technology (Fathema et al., 2015; Ilic et al., 2024). In parallel, many studies have reported that SE has an effect on ease of use (e.g. Fearnley & Amora, 2020; Lavidas et al., 2021; Ong & Lai, 2006; Park et al., 2012; Sahin et al., 2022b). Accordingly, we formulated the hypothesis below.

H4. SE positively influences perceived ease of use.

Facilitating Conditions

Facilitating conditions (FC) are expressed as control beliefs regarding the availability of organizational resources and support structures to facilitate the use of a system (Venkatesh & Bala, 2008). In another definition, it is explained as the technical and infrastructure support that the user receives in terms of technology use (Teo, 2009), and the factors that help the individual to achieve a task (Thompson et al., 1991). FC, such as institutional support, technical infrastructure, and professional development opportunities, play a crucial role in faculty members' adoption of online education technologies. When faculty have access to adequate resources, training, and technical assistance, they are more likely to perceive these technologies as useful for enhancing teaching effectiveness. Additionally, well-structured support systems reduce technical and administrative barriers, making the technologies easier to use and integrate into existing workflows. Thus, strong facilitating conditions not only enhance perceived usefulness but also improve perceived ease of use, ultimately encouraging faculty engagement with online instructional tools. In the field of technology acceptance, there are several studies that have addressed the impact of FC on perceived ease of use and perceived usefulness from different perspectives (e.g. Fathema et al., 2015; Lavidas et al., 2021). In this respect, we proposed the following hypotheses.

H5. FC positively influence (a) perceived usefulness and (b) perceived ease of use.

Openness

Openness (OPN) is a personality trait that plays a crucial role in facilitating the adoption of information technologies and innovations within the education sector. It is associated with mental curiosity, open-mindedness, and a penchant for originality (Ali, 2019; Weele, 2013). OPN reflects an individual's willingness to embrace change in their ideas and beliefs through new experiences, as well as their readiness to take risks when confronted with uncertainties, which are particularly relevant in the context of technology adoption

in education. Instructors with higher openness may more inclined to explore and experiment with digital tools, making them more likely to perceive these technologies as intuitive and easy to use. Additionally, their adaptability and curiosity foster a positive attitude toward technology integration, increasing their intention to adopt and utilize online instructional tools. In contrast, those with lower openness may be more resistant to change, perceiving new technologies as complex or unnecessary. Thus, openness enhances both perceived ease of use and faculty members' willingness to engage with online education technologies. In this context, studies on acceptance and use of information technologies in education, there are findings supporting the relationship of openness with ease of use and intention (Sahin et al., 2021; Sahin & Dursun, 2022). Thus, we created the following hypotheses.

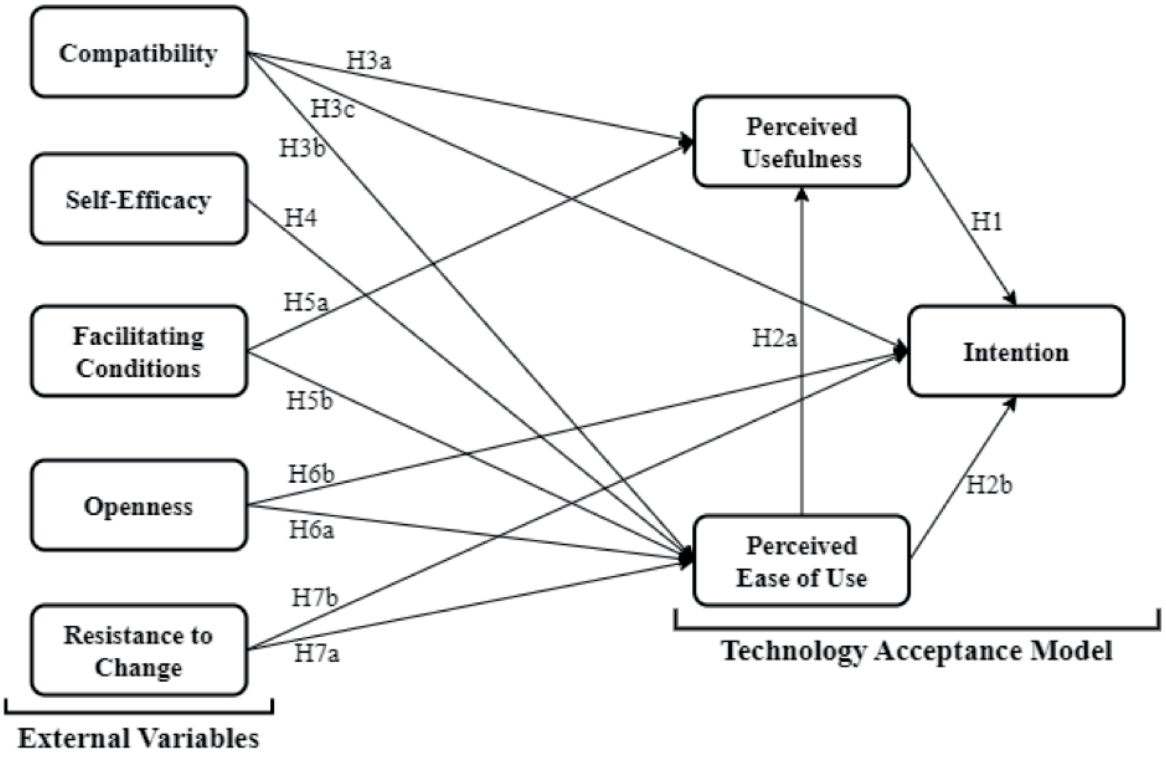
H6. OPN positively influences (a) perceived ease of use and (b) intention.

Resistance to Change

Resistance to change (RC) is expressed as one of the critical barriers within the scope of technology use and it is recommended to be taken into account in the adoption processes (Kilicer & Odabasi, 2010). RC, which sheds light on the characteristics of users to resist change (Oreg, 2003), is an important factor for the acceptance and use of technology (Nov & Ye, 2008). RC has an important role in the design, development and integration processes of technologies for both students and instructors (Lwoga & Komba, 2015). Faculty members who exhibit resistance to change may struggle with adopting online education technologies, perceiving them as complex and disruptive to their established teaching routines. A reluctance to adapt to new digital tools can lead to heightened perceptions of difficulty, reducing perceived ease of use. Furthermore, resistance to change can diminish faculty members' willingness to integrate these technologies into their instruction, even if they recognize potential benefits, thereby negatively impacting their intention to use them. In contrast, those who are more open to change are likely to perceive online technologies as more intuitive and are more inclined to adopt them in their teaching practices. Similarly, the relationships of RC with TAM constructs, which have been examined in the context of many technologies in the field of education, have been revealed in the literature in various studies conducted with both university students, teacher candidates and instructors (e.g. Sanchez-Prieto et al., 2019; Sahin et al., 2021). In line with this, we formulated the following hypotheses.

H7. RC negatively influences (a) perceived ease of use and (b) intention.

The research model created based on the proposed hypotheses is presented in the Figure 1.



Research Design

This study was designed using the survey research model, a widely utilized approach for collecting data to identify specific characteristics of a defined group (Buyukozturk et al., 2013). Survey models aim to describe existing conditions, examine relationships between variables, and provide insights into patterns within a given population (Creswell, 2014). In this approach, researchers do not manipulate any variables but instead focus on capturing and analyzing data as it naturally occurs. The primary objective is to present an accurate depiction of the current state of the phenomenon under investigation, making survey research particularly suitable for studies exploring perceptions, attitudes, and behavioral tendencies.

The survey research model employed in this study offers several strengths, particularly when paired with advanced statistical techniques for data analysis. Because surveys do not manipulate variables, they provide valuable insights into how participants naturally perceive and respond to specific phenomena (Creswell, 2014). This method not only allows researchers to describe existing conditions but also facilitates the exploration of relationships between key variables, which is essential for testing the extended Technology Acceptance Model (TAM) framework in this study. To enhance the rigor of analysis, Structural Equation Modeling (SEM) is utilized, enabling the simultaneous examination of multiple dependent and independent variables rather than analyzing them in isolation. Unlike traditional regression techniques, SEM accounts for latent variables through multiple observed indicators, which reduces measurement error and improves the accuracy of relationship estimates. Additionally, bootstrapping analysis, a non-parametric resampling technique, strengthens the reliability of findings by repeatedly drawing samples from the dataset to estimate confidence intervals. Unlike traditional methods, bootstrapping does not assume normality, making it particularly effective in studies with moderate to large sample sizes. Furthermore, it reduces Type I and Type II errors, ensuring robust and statistically reliable results, even when sample sizes are not exceptionally large (Hair et al., 2019; Hayes, 2022).

Participants

Considering the resources of the researchers, the convenience sampling method was employed. The participants of the research consisted of 301 instructors from five different state universities who had thought both face-to-face and online lessons using e-learning systems, learning management systems and distance education platforms within the scope of hybrid education in the 2021 Fall and 2022 Spring semesters. The number of participants is quite sufficient in terms of factor analysis and structural equation modeling (Kline, 2011). Instructors were contacted through online channels, and data were gathered using Google Forms. Necessary approvals were obtained from the university's ethics committee, and the informed consent form explicitly stated that participation was entirely voluntary. Participant profiles are detailed in Table 1.

Table 1. Participant profile

Instructors		f	%
Title	Research Assistant	90	29.9
	Teaching Assistant	39	13.0
	Assistant Professor	91	30.2
	Associate Professor	64	21.3
	Professor	17	5.6
Gender	Female	115	38.2
	Male	186	61.8
Age	**Min**	**Max**	**Mean**
	24	72	37.8

Data Collection

The data collection tool of the study consists of the demographic form, which includes questions about the personal information of the instructors, and the scale, which includes items for model structures. The scale part consisted of 8 constructs, consisting of thirty-three 5-point Likert-type items (1= completely disagree, 5= completely agree). The second part of the tool consists of the variables of intention, perceived usefulness, perceived ease of use, self-efficacy, facilitating conditions, compatibility, openness and resistance to change. Items on intention, perceived usefulness and perceived ease of use were adapted from Sahin et. al (2022b), items on self-efficacy, facilitating conditions and compatibility were adapted from Sahin et. al (2022a), and items on openness and resistance to change were adapted from Kilicer and Odabasi (2010) and Sahin and Dursun (2022). The opinions of field experts were sought for language and content validity and a pilot study was carried out for the clarity of the expressions in the regulated items.

Data Analysis

SPSS 25 and SmartPLS 3 programs were used in the analysis of the data. Data organization and descriptive analyzes were performed via SPSS, confirmatory factor analysis, structural equation modeling and bootstrapping analysis were performed via SmartPLS. In the analysis of the data, firstly descriptive analyzes were performed and then the measurement model was evaluated. In the evaluation of the measurement model, primarily convergent and discriminant validity were tested in the context of construct validity (Hair et al., 2017). Convergent validity was assessed by examining average variance extracted (AVE), factor loadings, cronbach's alpha (α), and composite reliability (CR). To evaluate discriminant validity, the Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratio were employed (Henseler et al., 2015). Additionally, the presence of multicollinearity among the constructs was investigated using the variance inflation factor (VIF) (Hair et al., 2017). In addition, model fit was tested and path modeling and bootstrapping analysis were performed to determine whether the hypotheses were significant or not.

RESULTS

Assessment of Measurement Model

Convergent and discriminant validity were tested in the evaluation of the measurement model. Analysis results showed that item loadings were in the range of 0.715-0.955, and Cronbach's alpha (α) (0.847-0.941) and composite reliability (0.861-942) values were above 0.7, and AVE values above 0.5 for all constructs (Hair et al., 2011; Hair et al., 2017). Accordingly, convergent validity was achieved (Table 2).

Table 2. Convergent validity

Factors	Item	Loading	α	CR	AVE
Intention	INT1	0,939	0,920	0,926	0,863
	INT2	0,891			
	INT3	0,955			
Perceived Usefulness	PU1	0,931	0,935	0,937	0,885
	PU2	0,954			
	PU3	0,937			
Perceived Ease of Use	PEU1	0,829	0,847	0,867	0,685
	PEU2	0,868			
	PEU3	0,736			
	PEU4	0,870			
Self-Efficacy	SE1	0,925	0,941	0,942	0,850
	SE2	0,926			
	SE3	0,918			
	SE4	0,919			
Facilitating Conditions	FC1	0,854	0,851	0,878	0,688
	FC2	0,891			
	FC3	0,793			
	FC4	0,774			
Compatibility	COMP1	0,858	0,855	0,861	0,698
	COMP2	0,834			
	COMP3	0,869			
	COMP4	0,779			
Openness	OPN1	0,829	0,890	0,900	0,694
	OPN2	0,886			
	OPN3	0,801			
	OPN4	0,792			
	OPN5	0,854			
Resistance to Change	RC1	0,715	0,875	0,887	0,616
	RC2	0,812			
	RC3	0,823			
	RC4	0,751			
	RC5	0,822			
	RC6	0,778			

α: Cronbach›s alpha, CR: Composite reliability, AVE: Average variance extracted

The discriminant validity of the model was evaluated using the Fornell-Larcker criterion and the HTMT (heterotrait-monotrait) ratio. The fact that the square roots of the AVE values were greater than the correlations between the constructs showed that the Fornell-Larcker criterion was met (Table 3). Moreover, according to the HTMT results, all inter-structural values are below 0.85 ($HTMT_{85}$) (Table 4). Thus, discriminant validity was established. Finally, VIF (1.406-2.247) values less than 5 (Table 5) and SRMR less than 0.8 indicate that there is no problem in terms of multi-collinearity and model fit was good (Hair et al., 2017; Henseler, 2010).

Table 3. Fornell-Larcker Criteion

Factors	COMP	FC	INT	OPN	PEU	PU	RC	SE
COMP	0,836							
FC	0,597	**0,829**						
INT	0,720	0,617	**0,929**					
OPN	0,412	0,377	0,520	**0,833**				
PEU	0,522	0,552	0,568	0,372	**0,827**			
PU	0,665	0,624	0,675	0,333	0,523	0,941		
RC	-0,269	-0,267	-0,383	-0,520	-0,388	-0,276	**0,785**	
SE	0,629	0,661	0,608	0,461	0,717	0,567	-0,358	**0,922**

Table 4. HTMT Ratio

Factors	COMP	FC	INT	OPN	PEU	PU	RC	SE
COMP								
FC	0,695							
INT	0,810	0,678						
OPN	0,462	0,407	0,566					
PEU	0,593	0,610	0,628	0,408				
PU	0,743	0,687	0,726	0,358	0,564			
RC	0,298	0,283	0,412	0,574	0,433	0,299		
SE	0,699	0,706	0,653	0,499	0,793	0,604	0,391	

Assesment of Structural Model

According to the path modeling analysis (Table 5), the tested model explained %54.7 of PEU, %53.5 of PU and %65.4 of INT (Figure 2). Bootstrapping analysis showed that 9 of the proposed hypotheses were supported and 4 were rejected. All of the proposed hypotheses among TAM variables (PU, PEU, INT) were significant. Accordingly, H1, H2a and H2b were supported. In the context of the hypotheses regarding COMP, COMP->PU and COMP->INT were significant, while COMP->PEU was not significant. Thus, H3a and H3c were accepted, while H3b was rejected.

Table 5. Path analysis results

Hypothesis	Path	Coefficient	t-Value	p-Value	f2	VIF	Results
H1	PU -> INT	0,280	3,476**	0,001	0,116	1,947	Supported
H2a	PEU -> PU	0,142	2,090*	0,037	0,028	1,568	Supported
H2b	PEU-> INT	0,136	2,780**	0,005	0,033	1,619	Supported
H3a	COMP -> PU	0,413	5,398***	0,000	0,216	1,694	Supported
H3b	COMP -> PEU	0,081	1,190(ns)	0,234	0,008	1,874	Not Supported
H3c	COMP-> INT	0,368	5,219***	0,000	0,192	2,042	Supported
H4	SE -> PEU	0,555	7,473***	0,000	0,302	2,247	Supported
H5a	FC-> PU	0,298	2,953**	0,003	0,108	1,774	Supported
H5b	FC -> PEU	0,110	1,211(ns)	0,226	0,014	1,973	Not Supported
H6a	OPN -> PEU	-0,042	0,798(ns)	0,425	0,002	1,606	Not Supported
H6b	OPN -> INT	0,199	2,366**	0,018	0,074	1,548	Supported
H7a	RC -> PEU	-0,160	3,202**	0,001	0,040	1,406	Supported
H7b	RC -> INT	-0,050	1,108(ns)	0,268	0,005	1,465	Not Supported

On the other hand, SE->PEU and FC->PU relationships were significant, while FC->PEU was not significant. Accordingly, H4 and H5a were supported, while H5b was rejected. Finally, OPN->INT and RC->PEU were significant, while OPN->PEU and RC->INT were not. Thus, H6b and H7a were accepted, while H6a and H7b were rejected. The most robust relationships in the tested model were between SE-PEU (β=.0,555 t-Value=7,473), COMP-PU (β=.0,413 t-Value=5,398) and COMP-INT (β=.0,368 t-Value=5,219), respectively. The COMP->INT relationship also showed that among the constructs in the model, compatibility had the strongest effect on intention

DISCUSSIONS

In this study, factors influencing instructors' intention to use hybrid education method and online instructional technology were investigated through an extended TAM. In this way, it is aimed to provide valuable information that will help to ensure effective use both in case of re-experiencing a compulsory hybrid education period and in case the instructors use the hybrid education voluntarily in a normal educational setting. The model tested in the context of hybrid education revealed a high explanation rate, explaining 54.7% of PEU, 53.5% of PU and 65.4% of INT. Accordingly, it can be said that the model proposal provides a successful guide and an effective theoretical basis for explaining the hybrid education method and online instructional technology usage intention. In addition, the simple, robust and effective nature of TAM (Venkatesh et al., 2003; Lu et al., 2019; Sahin et al., 2021) has also been validated in the context of hybrid education environments.

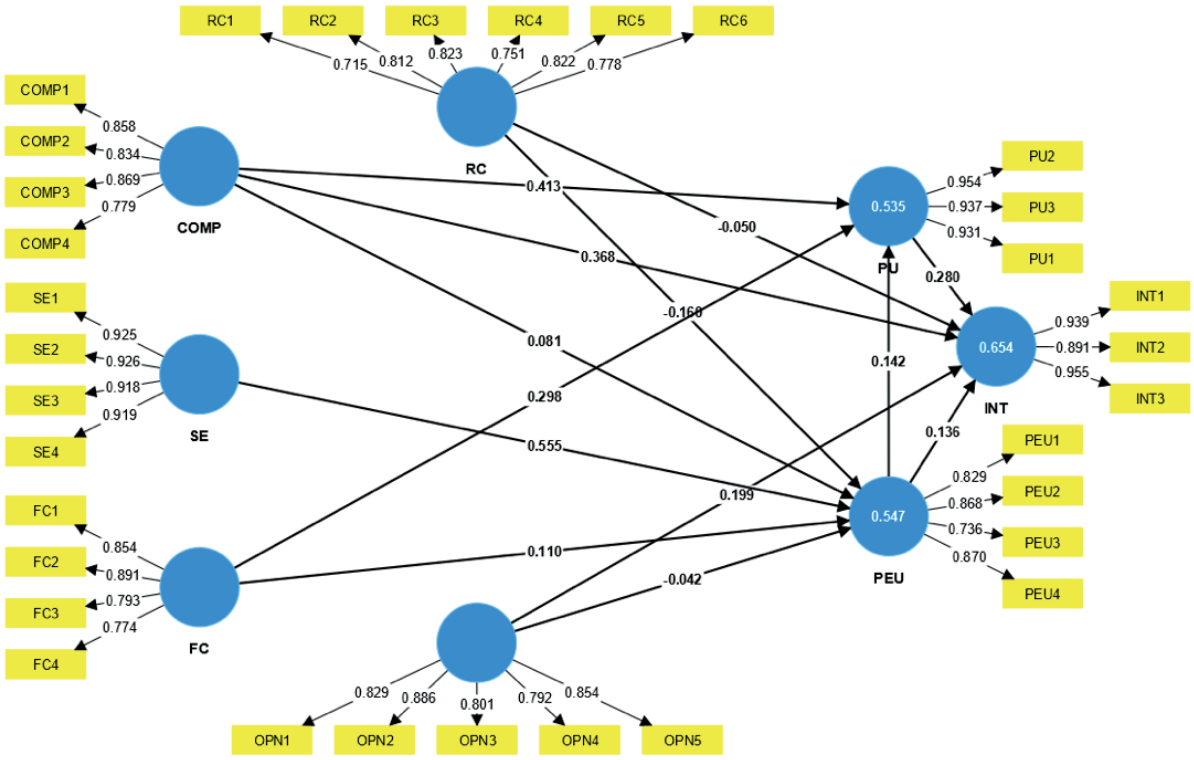


Figure 2. Path modeling

The relationships established between the TAM constructs (PEU->PU, PEU->INT, PU->INT) were all significant. Accordingly, the results indicate that instructors' perceptions of the potential improvement in their professional performance achievable through hybrid education, as well as their perceptions of the effort required to teach with online instructional technologies, significantly influence their behavioral intentions. In addition, the ease-of-use relationship suggests that instructors' perceptions that online instructional technologies do not require much effort help them perceive these technologies as more useful. Previous studies in the field of education with both students and instructors largely support these findings (Al-Alak & Alnawas, 2011; Alharbi & Drew, 2014; Fathema et al., 2015; Lavidas et al., 2021; Sahin & Sahin, 2022; Sahin & Dursun, 2022; Zarafshani et al., 2020).

Among the hypotheses proposed for CMP, COMP->INT and COMP->PU were supported, while COMP->PEU was not. The results of COMP->INT and COMP->PU indicate that meeting the expectations of instructors from hybrid education positively affects both their perceptions of the performance increase and their tendency to use this teaching method. In particular, COMP->PU relationship, which constitutes one of the most robust relationships in the model, emphasizes that the online instructional technologies of the hybrid education meet the expectations of the instructors in terms of being performance-enhancing tools. On the other hand, the result regarding PEU suggests that the expectations for the level of effort required by the online instructional technologies used in the hybrid education are not met in terms of ease of use. Past studies conducted with both instructors, teachers and students largely support these findings (Sahin et al., 2021; Sahin & Sahin, 2021; Sahin et al., 2022b; Ursavas, 2014). In the context of CMP, which has been relatively understudied, especially in educational settings where compulsory use is essential, Sahin et al. (2021) obtained similar results to those of this study. It can be considered as an important result that the findings of full online education and hybrid education are the same for CMP. This result indicates that even if online education is partial in hybrid education, compulsory use has similar results with full online education. In other words, the results indicate that if the instructors are in an educational setting based on compulsory use, how much effort a new education method or technology requires is no longer decisive.

The relationship between FC and PU was significant, whereas its relationship with PEU was not. FC->PU result indicates that opportunities such as technical support and training provided to the instructors positively

affect the perception of both professional performance and student success that can be obtained from hybrid education. In other words, instructors perceive hybrid education as more beneficial when resources such as software, hardware, training and support are sustained. Few studies have examined the association of FC with PU, which is largely associated with PEU and rarely with INT. In this respect, although the results of the study provide rare information, it does not seem possible to make a clear judgment. The FC->PEU result suggests that the resources that facilitate the educational process do not have a significant effect on their perceptions of the effort required in using online instructional technologies. In other words, the availability of resources such as infrastructure, training and technical support of the instructors is not a decisive factor in their perceptions of the effort required by hybrid education. Although there are studies reporting similar results (e.g. Fathema et al., 2015; Fearnley & Amora, 2020), the literature generally indicates that FC has an influence on PEU (e.g. Lavidas et al., 2021; Sahin et al., 2021; Teo & Huang, 2019; Zarafshani et al., 2020). Considering both the past studies and the nature of FC in the context of technology acceptance, this result can be said to be surprising. The fact that online instructional technologies such as learning management systems, open education platforms and e-learning systems used in hybrid education have a user-friendly design that does not require much effort can be presented as a possible explanation for this result. Another possible explanation is that instructors have a high level of belief in their knowledge and skills regarding instructional technologies and are confident in terms of online technologies. In short, regarding this finding, it can be interpreted that the instructors do not need or care about resources such as facilitating conditions if they see themselves as efficient and competent.

The SE->PEU hypothesis was supported. This result indicates that instructors' beliefs in their knowledge and skills related to online instructional technologies have an impact on their perceptions of the level of effort required for effective use of these technologies. This situation suggests that if the instructors are confident in the use of online technologies, they see instructional technologies as tools that require less effort and are easy to use. Studies that have reached similar results widely in the literature (Fathema et al., 2015; Fearnley & Amora, 2020; Lavidas et al., 2021; Sahin et al., 2021; Zarafshani et al., 2020) support the finding regarding the SE->PEU hypothesis.

While the OPN->INT relationship was significant, the RC->INT relationship was not. The OPN->INT showed that openness to technological transformations in education has an effect on the intention to use hybrid education method. This result suggests that teaching staff will tend to use online instructional technologies and hybrid education method if they have the personality trait of openness to change. However, the RC->INT result indicates that resistance to innovations had no effect on intention to use. The results of another study, in which the use of technology by the instructors was mandatory, overlaps with the RC->INT finding, but contradicts the OPN->INT (Sahin et al., 2021). On the other hand, in the context of PEU, RC->PEU was supported while OPN->PEU was rejected. The fact that the RC->PEU relationship was significant revealed that the resistance to change characteristics of the instructors had a negative effect on the ease of use. This result indicates that instructors' reluctance to use new methods and technologies in education may cause them to perceive hybrid education and online instructional technologies as a more demanding process or a more difficult task. The non-significant OPN->PEU result showed that openness to change did not have an effect on ease of use. In other words, the result suggests that instructors' perceptions of the effort required by hybrid education are not affected by their openness to change personality traits. However, the fact that OPN and RC have been relatively under-studied in the general technology acceptance literature, as well as the very limited empirical findings on these constructs in educational settings with a compulsory nature make it difficult to compare the results of the study and draw clear conclusions.

CONCLUSION AND IMPLICATIONS

In this study, the intention to use the hybrid education method and online instructional technologies of the instructors was examined through a model by extending the technology acceptance model, and the model was validated. High explanation rates of output constructs such as 54.7% for PEU, 53.5% for PU and 65.4% for INT indicate that the model serves its purpose well and is an effective tool that can provide a roadmap to hybrid education. In addition, the model proposal, which has been validated in a rare context such as hybrid education and instructors, has once again consolidated the simple, flexible and powerful structure of TAM.

Therefore, this study contributes to the field of education both theoretically and practically, particularly concerning the intersection of technology and educational methods.

Considering the findings that the motivational effects of usefulness and ease of use, which are the most important determinants of intention (Davis, 1989; Venkatesh et al., 2003), weaken in environments where use is compulsory (Sahin et al., 2021), the result reached in this study is important. In other words, it can be interpreted that the online instructional technologies employed in the hybrid education have achieved something at least at a certain level in terms of increasing performance and providing ease of use. This result suggests that even though compulsory use is common, the effects of potential factors may change if the technology or education method is different. In this direction, it should be focused on investigating the use of different instructional technologies and educational methods in different compulsory settings. With the acquisition of technology and method-specific detailed information, it will be possible to present an effective framework especially for instructional and program designers.

One of the major results of the study is that FC's relationship with PU is significant, but its relationship with PEU is not. It is a rare case that both the FC->PEU relationship is significantly different from previous studies and the PU relationship is relatively ignored in the field. Although this leads us to possible explanations such as the self-confidence of the instructors in terms of their knowledge and skills or the user-friendliness of educational online technologies, the main thing is technologies that can provide effective use with less effort and educators who are competent in the use of technology in education. In particular, considering that students tend to teach the way they are thought (Orhan-Goksun, 2017; Orhan-Goksun & Kurt, 2017), regardless of whether the education method is fully online or hybrid, encouraging instructors and strengthening self-efficacy with programs such as in-service training should be among the priorities of policy makers, administrative staff and program designers.

Another major result of the study is the findings regarding the COMP factor. It is noteworthy that online instructional technologies are perceived as performance enhancing tools by instructors, but on the other hand, they are not perceived as easy-to-use tools. This factor, which has a vital role such as the suitability of the technology used in the context of the fulfillment of a particular task (Venkatesh & Davis, 2000), is one of the critical barriers in terms of technology use in education (Sanchez-Prieto et al. 2019). In this respect, it is critical that the design of these technologies in a way that meets the effort expectations of the instructors for effective use, even if full online education is not in question, should be considered first by policy makers and then by instructional technology designers.

In line with the findings obtained within the scope of this study, authors anticipate that there are crucial areas that need to be addressed in future studies in order to advance the current study. Addressing specific technologies (learning management systems, distant education platforms etc.) in the context of hybrid education environments with proven technology acceptance models such as unified theory of acceptance and use of technology (Venkatesh et al., 2003) and theory of reasoned action (Fishbein & Ajzen, 1975) has the potential to provide rare information. On the other hand, testing methods such as flipped and blended learning, which are hybrid in nature, in terms of intention, continuance intention and actual use, with the validated model in the study or with other models containing different structures can provide important findings in terms of technology and hybrid education. Although interesting findings related to OPN and RC were obtained in the study, it was difficult to make clear comparisons due to the small number of studies dealing with these constructs in a similar way. The fact that these variables are critical personality traits, especially in the context of innovativeness and the fact that innovativeness is effective in triggering more positive reactions (Ali, 2019), presents an important point to focus on future studies. Accordingly, this research perspective can contribute to the explanation of technology acceptance and usage behaviors in a theoretical way, and it can help to carry out more successful integration processes in practice.

LIMITATIONS AND FUTURE DIRECTIONS

Despite its contributions, this study has several limitations that should be acknowledged. First, the study relies on self-reported survey data, which may introduce common method bias and social desirability effects. Although efforts were made to ensure respondent anonymity and minimize bias, future research could benefit from incorporating objective usage data or longitudinal designs to track actual adoption behaviors

over time. Second, the study is conducted within a specific institutional and cultural context, which may limit the generalizability of the findings. Faculty members' attitudes toward online instructional technologies in hybrid education may vary across different educational systems, disciplines, and institutional policies. Future studies should replicate this research in diverse geographical and institutional settings to assess the broader applicability of the findings.

Third, while this study employs Structural Equation Modeling (SEM) to examine relationships between key variables, future research could use experimental or longitudinal designs to establish causal relationships between technology acceptance factors and actual usage behavior. Fourth, the study focuses on specific individual and external factors influencing faculty members' adoption of instructional technologies, yet other variables—such as organizational culture, workload, institutional incentives, or student engagement—may also play a critical role in shaping adoption behaviors. Future research could extend the Technology Acceptance Model (TAM) by integrating additional contextual and psychological factors, such as technology-related anxiety, digital competence, or institutional support mechanisms.

Finally, while bootstrapping analysis enhances the robustness of statistical findings, the study's sample size and response rate may still impact the statistical power of some estimates. Future studies could employ larger, more representative samples and mixed-method approaches (e.g., qualitative interviews, focus groups) to gain deeper insights into faculty members' experiences with hybrid education technologies. Addressing these limitations in future research will contribute to a more comprehensive understanding of faculty adoption of instructional technologies in hybrid learning environments. By exploring contextual variations, employing diverse methodologies, and integrating additional theoretical perspectives, future studies can further refine models of technology acceptance and provide actionable insights for institutions seeking to enhance digital teaching practices.

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