



Factors Affecting School Teachers' Satisfaction with Online Classes during the Outbreak of COVID-19

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Authors' contributions

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Many research studies have been conducted to understand the end-users satisfaction with online teaching. Yet, there are scarce studies focused on the teachers' satisfaction with online classes. This research aims to study factors affecting teachers' satisfaction with online teaching systems. To this purpose, an extended Technology Acceptance Model (TAM) is proposed in this study. The possible correlation among variables and whether or if there are gender disparities were also examined. An online questionnaire was deployed using Google forms, and 330 teachers filled out the questionnaire. Structural Equation Modeling (SEM) was used to conduct the path analysis and test hypotheses. A multi-group analysis was conducted to investigate whether gender was related to teacher satisfaction with online education. There were three key results. First, perceived usefulness, ease of use, and self-efficacy directly influenced teachers' satisfaction with online teaching. Second, personal innovativeness indirectly impacted teachers' satisfaction through perceived usefulness and perceived ease of use. Third, gender did not affect the eight hypotheses. This research has theoretical implications since it contributes to the study of online education satisfaction by extending the TAM model to examine the factors affecting teachers' satisfaction with online teaching. This research also has practical implications in that it may be used as a reference for school administrators, online learning system designers, and decision-makers.

Keywords: *Online education; teachers' satisfaction; TAM.*

1. INTRODUCTION

In early 2020, most nations declared a national emergency because of the COVID-19 outbreak. Countries throughout the globe were obliged to implement a variety of emergency management procedures due to this outbreak [1]. The governments of several nations have taken steps such as lockdowns, educational institution closures, and severe social distancing measures in response to the pandemic outbreaks. According to UNESCO's monitoring, more than 99.9 per cent of the world's teacher and student population has been affected by the closures of academic institutions [2]. However, the crises are often tied with chances, so it's time to comprehend the full potential of technology in the education domain.

In Jordan, the government started an approach called closing schools without suspending education [3], which converted face to face classes to online classes. Schools have been motivated to utilize online classes due to the COVID-19 proliferation. And thus, Microsoft Teams, Skype, Google Hangouts, Zoom and other innovative systems were introduced to teachers and students to conduct online classes. To keep courses running well, students, parents, and teachers were provided with clear guidelines and protocols to help them adapt to this new education model. However, the new education model raised issues about the quality and end-user satisfaction. Therefore, it is significant to evaluate if this education model meets the teachers and students needs. Many research studies have been conducted to understand the end-users satisfaction with online classes [3,4,5]. Yet, there are scarce studies focused on the teachers' satisfaction with online classes. To the best of our knowledge, this research is the first in the Jordanian context to investigate factors influencing teachers' satisfaction with online education platforms. Our research extends the Technology Acceptance Model (TAM) with other proper factors from the literature to study teachers' satisfaction with online classes.

2. OVERVIEW

2.1 Online Classes

In the education domain, online classes have become a new popular model [6]. Online

education platforms have increased around the globe since the internet has become more widely available [7]. Furthermore, utilizing online classes has been grown due to the proliferation of COVID-19. Many scholars and academics from across the world have studied online education due to the sector's fast expansion. For example, Jebriil [3] studied the determinants affecting online education satisfaction from the students' point of view. Task difficulty and pre-training socialization were explored by Yanson and Johnson [8] to see how they influenced online e-learning design. According to the findings, face-to-face socialization was shown to be more effective than online socialization or no socialization at all. Barak and Green [9] stated that online education should be reconsidered in order to improve students' confidence in online classes and promote their online activities.

The findings above show that many research studies have explored online education utilizing many evaluation methods. However, although online classes have been applied worldwide, little is known about the teachers' experience with this education model, where most research studies focused on the students' experience with online classes. Therefore, this research expands the TAM model with other appropriate variables from the literature to investigate the Jordanian teachers' satisfaction with online classes during the proliferation of COVID-19.

2.2 Teachers' Satisfaction (TS)

Teacher satisfaction in online education settings has received little attention in current research. For instance, Vezne [10] indicated that teachers were content with online learning. Cidral et al. [7] showed that teachers' satisfaction was significantly influenced by teacher attitude, system quality, assessment variety, and information quality. Moreover, Sun et al. [6] showed that teachers' satisfaction was significantly affected by seven critical factors: computer anxiety, teachers' attitude, quality of the course, flexibility, ease of use, usefulness, and variety in the assessment.

Studying the factors that influence teachers' satisfaction with an online learning model is essential for figuring out how to keep them actively participating in online learning on a long-term basis. Thus, this research study proposes

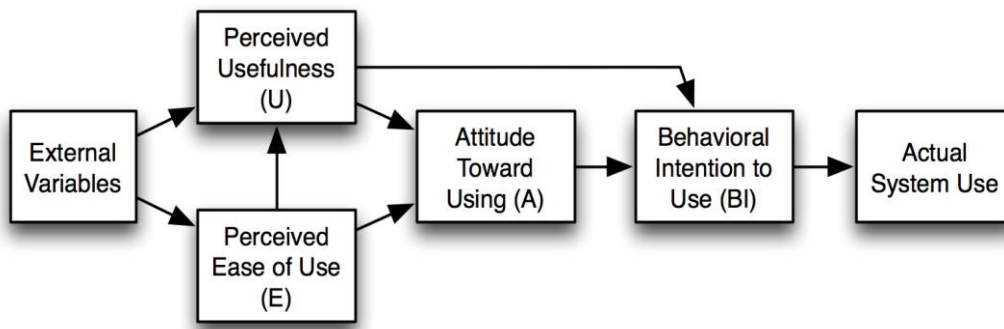


Fig. 1. TAM model

an extended TAM model to study factors influencing teachers' satisfaction with online classes in the Jordanian education context.

2.3 Technology Acceptance Model (TAM)

It was presented by Davis [11] to predict to what extent do individuals' acceptance of new technology or system. This model is commonly used in information system research to understand why a system is accepted or rejected. The TAM has been frequently used in online learning research. For example, Persico et al. [12] investigated the adoption of an online learning system by university students utilizing TAM model. The result showed that ease of use, effectiveness, and usefulness were crucial factors in predicting the students adoption intention. Scherer et al. [13] investigated teachers perceptions towards utilizing different information technology in online education. The empirical result showed that perceived ease of use was the key determinant among other determinants. In addition, teachers' intentions to utilize different online learning tools were assessed using TAM, and it was discovered that the ease of use had a favorable impact on teachers' teaching intentions [14]. In general, multiple more research studies show that TAM (especially ease of use and usefulness) is relevant for evaluating online learning [15,16,17]. Fig. 1 shows the TAM model.

3. RESEARCH MODEL AND HYPOTHESES

We intend to expand the TAM model to investigate the impact of online education on teachers' satisfaction (Fig. 2). We expand the TAM with other suitable factors from the literature (personal innovativeness, system quality, facilitating conditions, and self-efficacy) to study the factors that influence teachers' satisfaction

with the Jordanian online education model. Thus, we propose the following hypotheses.

3.1 Perceived Usefulness

Teachers' satisfaction with online classes may be influenced by perceived usefulness (PU). The term "usefulness" was coined by Davis [11] to describe "how well a person feels that utilizing a certain system would enhance their performance". Studies on online education showed that PU influenced the users' satisfaction. For instance, in their empirical study, Al-Rahmi et al. [18] found that PU substantially influenced students' satisfaction with online classes. Jebriil [3] found that performance expectancy (PU in TAM) substantially impacted online education students' satisfaction. This research argues that PU refers to teachers' perceptions of their performance improvement due to online education usage, which positively affects their satisfaction. Based on the above, we formulate the following hypothesis:

H1: PU significantly influences the teachers' satisfaction with online education.

3.2 Perceived Ease of Use

Teachers' satisfaction with online classes may be influenced by their perception of ease of use (PEOU). In this research, PEOU refers to teachers' perceptions that the platform is easy to use, positively impacting their satisfaction. It follows Davis' [11] definition of PEOU as one's conviction that utilizing the system would be effortless". Many research studies showed that PEOU influenced the users' satisfaction. For example, Xu and Du [19] indicated that PEOU significantly influenced the end-user satisfaction with the digital library. Jebriil [3] investigated factors influencing online education students satisfaction, and the result indicated that effort

expectancy (PEOU in the TAM) was a significant determinant of the students' satisfaction. Based on the above, we formulate the following hypothesis:

H2: PEOU significantly influences the teachers' satisfaction with online education.

3.3 Facilitating Conditions

Facilitating conditions (FCs) are “the consumers’ perceptions of the resources and support that they have available to perform a certain behavior” [20]. FCs for online education include technical support, computers, smartphones, and internet connection. In this research, it is defined as “the degree to which teachers perceive that an organizational and technological infrastructure exists to support the use of online learning, which influences their satisfaction”. In line with the above, the following hypothesis is formulated:

H3: FCs significantly influence the teachers' satisfaction with online education

3.4 System Quality

System quality (SQ) is described as “The degree to which a system performs in comparison to expectations” [21]. An online education system's responsiveness, compatibility, and ease of use are all characteristics that contribute to its overall quality [22]. SQ directly impacts user satisfaction in the Information System Success (ISS) model. Based on those above, this research studies the influence of SQ on teachers' satisfaction. Therefore, the following hypothesis is proposed.

H4: SQ significantly influences the teachers' satisfaction with online education.

3.5 Self-efficacy

Self-Efficacy (SE) is an important factor in technology utilization since individual traits differ significantly [23]. Our research defines SE as the degree to which teachers believe in their technical ability to use online education systems. Previous research studies showed that SE positively influenced users satisfaction [24] and perceived ease of use [25]. In line with the above, we formulate the following hypotheses:

H5: SE significantly influences the teachers' satisfaction with online education.

H6: SE significantly influences the teachers' PEOU.

3.6 Personal Innovativeness

Personal innovativeness (PI) is defined as “the degree to which an individual tends to be technology leader” [26]. Previous research studies showed that PI influenced the users' PEOU and PU. For example, Liu et al. [27] investigated the role of Personal Innovativeness in the mobile learning context. The result indicated that personal Innovativeness significantly influenced users' perceived ease of use and usefulness. Lewis et al. [28] studied the influence of personal Innovativeness on TAM constructs with university staff members. The findings showed that perceived ease of use and usefulness were significantly influenced by personal Innovativeness. In line with the literature, we formulate the following hypotheses:

H7: PI significantly influences the teachers' PU.

H8: PI significantly influences the teachers' PEOU.

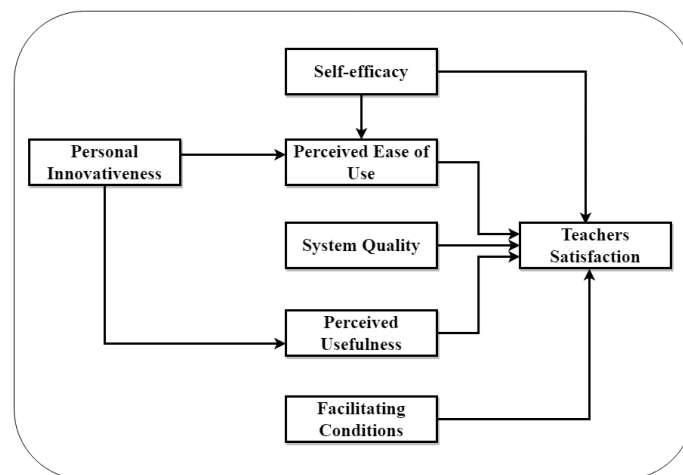


Fig. 2. The proposed conceptual model

4. METHODS

4.1 Participants and Procedure

Participants of this study are teachers from several Jordanian schools who have been utilizing online education for over a year now. To validate the content validity of the questionnaire, a pilot study involving 29 teachers and 4 information systems experts was conducted before it was made available to the public [29]. Minor modifications to the questionnaire were made in response to the pilot study findings and recommendations from experts.

Voluntary teachers participated in this research, and they were informed of the research purpose before taking part in the study. In addition, they were informed of their ability to deny participation or to withdraw from completing the questionnaire at any time throughout the data collection process.

4.2 Data Collection

This study employed an online Google form questionnaire to collect suitable data, where the questionnaire was deployed in the second semester of 2020 / 2021 to investigate teachers' satisfaction with online classes. The convenience sampling technique was used to collect data.

Three hundred fifty-five (355) teachers participated in the study. However, only 330 were included in the study's analysis, where 25 incomplete questionnaires were removed.

4.3 Questionnaire Development

This section demonstrates all the questionnaire items used to assess our proposed model's factors. Online education studies and information systems (IS) research studies were the basis for this list. Table (1) shows the questionnaire items and the previous studies from which the items were adapted.

To validate the content validity of the questionnaire, a pilot study involving 29 teachers and 4 information systems experts was conducted before it was made available to the public [29]. Minor modifications to the questionnaire were made in response to the pilot study findings and recommendations from experts. The questionnaire is divided into two sections: the first comprises demographic questions, and the second has factors' items that are measured on a five-point Likert scale. The scale goes from 1 to 5, with 1 denoting strongly disagree, 2 denoting disagree, 3 denoting neutral, 4 denoting agree, and 5 denoting strongly agree.

Table 1. Factors, Items, and resources of the questionnaire

Constructs	Items	Resources
Perceived Usefulness (PE)	PU1: Online education would enhance teaching effectiveness.	[11] [19]
	PU2: Teaching online helps me save time.	[18]
	PU3: I found online education useful in the teaching process	
Perceived Ease of Use (PEOU)	PEOU1: Using online education platforms is easy for me.	[11]
	PEOU2: It is easy for me to become skillful at using online education platforms	[19] [18]
	PEOU3: Dealing with online education platforms would not require a lot of effort	
Facilitating Conditions (FCs)	FCs1: I can use online education platforms since I have the requisite knowledge and skills.	[20] [3]
	FCs2: Given my available tools (computers and the internet), using online education platforms is viable.	
	FCs3: When I encounter difficulties utilizing online education systems, assistance is readily accessible.	
System Quality (SQ)	SQ1: When I'm teaching online, I have no difficulties with the platforms.	[21] [22]
	SQ2: When I react to students' discussions, I don't have any difficulty.	[3]

Constructs	Items	Resources
Self-Efficacy (SE)	SQ3: I don't face any issues when I post assignments for the students.	
	SE1: I am confident in my ability to solve most issues that arise when utilizing online education platforms.	[23] [24]
	SE2: I can maintain my calm when confronted with a system problem.	[25]
Personal Innovativeness(PI)	SE3: Even if I can't obtain help from someone, I can still complete my work utilizing online education systems.	
	PI1: I always look for ways to experience new technologies and systems	[26] [28]
	PI2: To my colleagues, I am the first to experience new software and technology.	[27]
Teachers Satisfaction (TS)	PI3: Generally, I don't hesitate to try new technologies and systems	
	SS1: I like online teaching efficacy.	[7]
	SS2: I am quite pleased with my online teaching experience.	[6] [3]
	SS3: Generally, I am satisfied with my online teaching experience	

5. DATA ANALYSIS

5.1 Sample Characteristics

A total of 355 respondents fill in the online questionnaire during the second semester of 2020/2021, from March 31 to June 30, 2021. However, only 330 were included in the study's analysis, where 25 incomplete questionnaires were removed. Out of 330 accepted respondents, 193 were males, and 137 were females.

5.2 Measurement Model

The measurement model involves the evaluation of the Model's internal reliability, convergent validity, and discriminant validity. Each construct's internal consistency was tested using Cronbach's alpha test and composite reliability test, requiring a value larger than 0.7 [30]. In

addition, we used the Average Variance Extracted (AVE), requiring a value larger than 0.5 [31]. Finally, to establish discriminant validity, the square root of the AVE for each construct must be larger than the pairwise correlations with all other constructs [31]. The result showed that our model met the reliability and validity tests threshold, as shown in Table (2) and Table (3).

5.3 Structural Model

The path analysis and hypothesis testing were carried out using the structural model. Fig. 3 shows the path analysis diagram, and Table (4) shows the findings of the structural model. Eight hypotheses were tested in the proposed model, where six were accepted, and two were rejected. In addition, the path analysis showed that our model explained 0.741 of teachers' satisfaction variance, indicating a high predictive power.

Table 2. Reliability and convergent validity results

Constructs	Cronbach Alpha	Composite Reliability	AVE
Perceived Usefulness	0.794	0.879	0.709
Perceived Ease of Use	0.906	0.941	0.842
Facilitating Conditions	0.807	0.886	0.722
System Quality	0.846	0.908	0.767
Self-Efficacy	0.834	0.900	0.753
Personal Innovativeness	0.919	0.943	0.806
Teachers Satisfaction	0.854	0.912	0.775

Table 3. Discriminant validity result

	FCs	PEOU	PI	PU	SE	SQ	TS
FCs	0.844						
PEOU	0.431	0.918					
PI	0.587	0.62	0.898				
PU	0.438	0.459	0.512	0.842			
SE	0.442	0.58	0.665	0.568	0.868		
SQ	0.452	0.549	0.652	0.509	0.753	0.876	
TS	0.444	0.584	0.598	0.617	0.839	0.656	0.88

Table 4. Structural model result

Hypothesis		Path (β)	Sample Mean (M)	Standard Deviation (STDEV)	P-value	Result
H1: Perceived usefulness	→ Teachers' satisfaction	0.181	0.178	0.055	0.001	Supported**
H2: Perceived ease of use	→ Teachers' satisfaction	0.107	0.107	0.047	0.022	Supported*
H3: Facilitating conditions	→ Teachers' satisfaction	0.027	0.030	0.038	0.480	Rejected
H4: System quality	→ Teachers' satisfaction	-0.013	-0.011	0.059	0.830	Rejected
H5: Self-efficacy	→ Teachers' satisfaction	0.671	0.672	0.062	0.000	Supported***
H6: Self-efficacy	→ Perceived ease of use	0.301	0.305	0.069	0.000	Supported***
H7: Personal innovativeness	→ Perceived usefulness	0.512	0.514	0.066	0.000	Supported***
H8: Personal innovativeness	→ Perceived ease of use	0.420	0.416	0.073	0.000	Supported***

Note: * P-value < 0.050; ** P-value < 0.010; *** P-value < 0.001

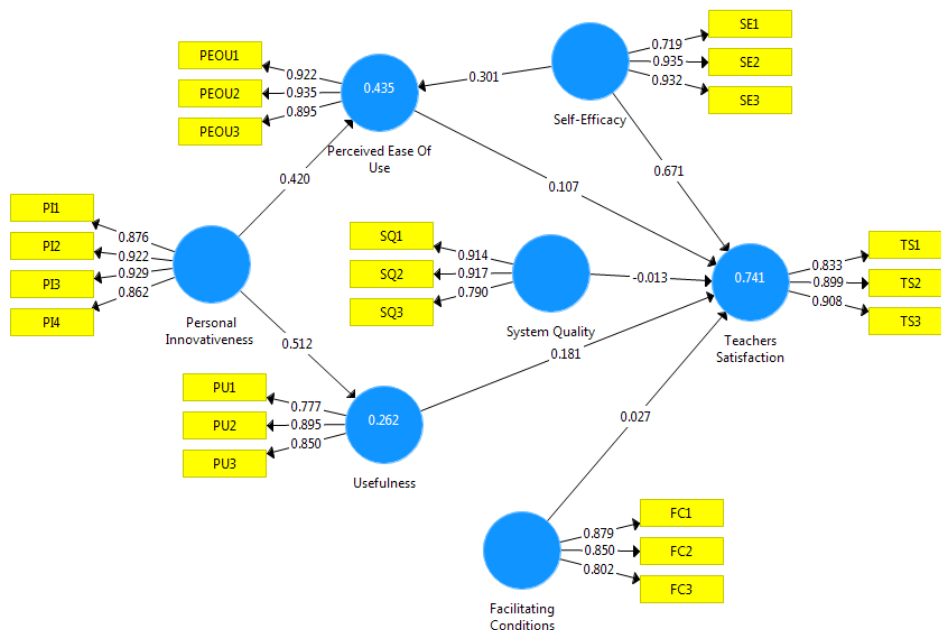


Fig. 3. Path analysis diagram

Table 5. Result of moderating effect analysis

Hypothesis			Path Coefficients Difference	P-value
H1: Perceived usefulness	→	Teachers' satisfaction	0.021	0.862
H2: Perceived ease of use	→	Teachers' satisfaction	-0.034	0.721
H3: Facilitating conditions	→	Teachers' satisfaction	0.021	0.792
H4: System quality	→	Teachers' satisfaction	0.001	0.975
H5: Self-efficacy	→	Teachers' satisfaction	-0.008	0.943
H6: Self-efficacy	→	Perceived ease of use	-0.013	0.921
H7: Personal innovativeness	→	Perceived usefulness	0.039	0.761
H8: Personal innovativeness	→	Perceived ease of use	0.039	0.787

The analysis findings indicated that perceived usefulness significantly influenced teachers' satisfaction ($\beta = 0.181$, $P < 0.01$); thus, hypothesis H1 was supported. Perceived ease of use was determined to affect teachers' satisfaction significantly ($\beta = 0.107$, $P < 0.05$), supporting hypothesis H2. Facilitating conditions have not been shown to influence teachers' satisfaction ($P > 0.05$), which rejected H3. The findings also indicated that the teachers' satisfaction was not influenced by system quality ($P > 0.05$), which rejected H4. Self-efficacy has been shown to affect teachers' satisfaction significantly ($\beta = 0.671$, $P < 0.001$), and significantly affected Perceived ease of use ($\beta = 0.301$, $P < 0.001$), supporting H5 and H6. Finally, the findings indicated that personal innovativeness significantly influenced Perceived usefulness ($\beta = 0.512$, $P < 0.001$) and Perceived ease of use ($\beta = 0.420$, $P < 0.001$), thus H7 and H8 were supported.

5.4 Moderating Effect of Gender

The moderating effect of gender was evaluated using the multi-group analysis in SmartPLS. If the P-value of the path coefficient difference between the two groups (male and female) is less than 0.5, indicating a moderating impact on the given path. Table (5) shows that gender is not statistically significant in our study since all the p-values greater than 0.5.

6. DISCUSSION

Although many research studies have been conducted to understand the end-users' satisfaction with online classes platforms [3,4,5], there are scarce studies focused on the teachers' satisfaction with such systems. Based on our research objective, we have reviewed the most

recent studies on end-users' satisfaction with these systems. Consequently, this study suggested an extended TAM model identify factors that influence instructors' satisfaction with online teaching systems. In the following paragraphs, we'll go through the results in more detail.

First, based on the research results, teachers' satisfaction with online classes was significantly influenced by perceived usefulness and ease of use. These results were expected since the teachers would be satisfied if they perceived the system simplicity and utility. These results are consistent with previous research in the online learning context, where both have been proven to be prominent predictors of users' satisfaction [6,3,32].

Second, the result showed that facilitating conditions have no significant impact on teachers' satisfaction. This result is inconsistent with previous research studies on the online learning context, which states that facilitating conditions are necessary for users' satisfaction with an experience new system [3,32]. This outcome demonstrates that the government in Jordan must pay more attention to developing Information Communication Technology (ICT) infrastructure.

Third, the result indicated that system quality has no impact on teachers' satisfaction in our study, which is inconsistent with the findings of many previous studies [33,34,35]. Teachers are satisfied with online teaching systems if they feel the systems offer specific qualities like system responsiveness, usability, and availability. This result suggests that designers and developers should pay more attention to such qualities while constructing online learning systems.

Fourth, the findings indicated that self-efficacy significantly influenced teachers' satisfaction and perceived ease of use. The findings imply that when the teachers have the needed skills to use ICT, their satisfaction and perceived ease of use will undoubtedly grow. This result is compatible with the results of many previous research studies in different contexts [36,37,38]. This finding suggests that Jordan's government is on the right road, given its substantial effort to improve teachers' skills to use modern ICT.

Finally, the findings showed that perceived usefulness and ease of use were significantly influenced by personal innovativeness, implying an indirect effect on teachers' satisfaction. This result demonstrates that teachers with innovativeness would be more satisfied with online teaching since they support using ICT systems. Such a relation is empirically proved in many research contexts [39,40], and this study showed its validity in the context of online learning.

7. CONCLUSION

This study developed a model to analyze the factors influencing teachers' satisfaction with online teaching in Jordan. As a result, we identified the most significant factors influencing teachers' satisfaction and developed an extended TAM model that can be used to assess teachers' satisfaction with online learning.

This research study adds to the body of knowledge on teacher satisfaction with online education in three ways:

1. The extended TAM model was developed based on the TAM model and previous other theories. Then, the extended model was utilized to design a questionnaire and perform empirical research. Teachers' satisfaction was explained by the proposed research hypotheses.
2. The findings of the research reaffirm that teacher satisfaction was predicted by self-efficacy, perceived ease of use, perceived usefulness, and personal innovativeness. In addition, gender did not affect the eight hypotheses, and self-efficacy was the most prominent predictor of teachers' satisfaction. Moreover, system quality and facilitating conditions were shown not to influence teachers' satisfaction.
3. Based on these findings, suggestions were put forward to improve teacher satisfaction

by increasing perceived ease of use, perceived usefulness, and self-efficacy and paying more attention to improving system quality and facilitating conditions.

This research has theoretical implications since it contributes to the study of online education satisfaction by extending the TAM model to examine the factors affecting teachers' satisfaction with online teaching. This research also has practical implications in that it may be used as a reference for school administrators, online learning system designers, and decision-makers.

8. LIMITATIONS AND FUTURE RESEARCH

This study, like any other, has significant scope for further research. As the use of online education grows in popularity, the effect of different moderating factors such as age and expertise with online education platforms should be added to the study. In addition, the data gathering method used was convenience sampling, which may be a poor sample technique for determining teachers' satisfaction with online learning. To enhance the suggested model, the researcher recommends a mixed-method approach rather than a quantitative one for future research.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Author has declared that no competing interests exist.

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