

Pre-Service Teachers Intention to Use Educational Technology: A Technology Acceptance Model Study

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ABSTRACT: The study aimed to examine the factors that affect the PST's behavioral intention to use educational technology using the Technology Acceptance Model (TAM). A quantitative, cross-sectional survey method was employed to collect data from PST in District Sudhnoti, AJK. The perceived usefulness (PU), perceived ease of use (PEOU), attitude toward using technology (ATUT), and actual use (AU) of educational technologies on behavioral intention to use (BIU) educational technologies were analyzed in the study, and the predictive power of TAM in this context was examined. Reliability analysis assessed the instrument's internal consistency, and descriptive statistics revealed that PST had positive perceptions of technology and intentions to use it in their future lessons. The regression analysis indicated that both PU and PEOU had direct and indirect influence on BIU, and they were the best predictors of BIU. ATUT had a positive impact on BIU, but to a lesser extent, and AU had little predictive power. The results validate the applicability of TAM and indicate that technology training for teachers should focus on practical, relevant classroom experiences, regular access to technology, and mentoring.

KEYWORDS: Technology Acceptance Model, Pre-service Teachers, Educational Technology

Introduction

This is what we call the revolution in education caused by the rapid advancement of ICT. This is what we call the revolution in the education world, resulting from the rapid advances in ICT. Digital technologies, such as digital classrooms (smart classrooms), mobile learning, flipped learning, online platforms and digital assessment tools, offer new opportunities in today's classrooms for interactive and meaningful learning. The teachers, therefore, are expected to have not only good subject knowledge, but also to be good users of technology in teaching. Since technology is a key facilitator of teaching and learning, it is essential for teacher training to be integrated into the training of teachers so that the students can be engaged in their learning process, improve the quality of teaching and learning, and prepare the students for the digital society (Mishra & Koehler, 2006; UNESCO, 2023).

PSTs are a component of educational change, and they will be the teachers of the future who will use technology in the classroom. Their level of confidence, attitude, PU, PEOU and appropriate training and support are the factors influencing their readiness and willingness to use educational technology. According to the previous study, the

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intention of using technology is greater when the PST believes that technology will improve teaching effectiveness or when they have confidence in using the technology (Teo, 2009; Joo et al., 2018).

The TAM is a useful model to learn about the factors affecting technology acceptance. There are two important determinants of an individual's acceptance of technology, namely, PU and PEOU (Davis, 1989). In the teacher education domain, PU is the teacher's confidence in the usefulness of educational technology for enhancing the teaching process, supporting student learning, and enhancing classroom interaction. PEOU refers to users' perceptions of how easy the technology is to use. PST who have a positive attitude toward the application of technology are more likely to develop positive attitudes. Positive attitudes to the use of technology are more likely to take shape if PST thinks that technology is useful and easy to use. The more positive their attitudes are toward PST, the more useful and easier-to-use it is.

Attitude towards technology is also important in predicting behaviour. Positive attitudes can boost PSTs' motivation and acceptance of technology in their prospective classrooms. Similarly, behavioural intention is considered to be a good predictor of technology use, with a person's behavioural intention representing how much he or she intends to or is willing to use technology in practice (Ajzen, 1991; Davis, 1989). Therefore, it is imperative that teacher education institutions (TEIs) that wish to train future teachers for technology-enhanced learning environments be aware of these factors.

This article explores the factors which influence PSTs' intention to use educational technology - perceived practicality, perceived comfort of usage, arrogance to skill and communicative intent. Teacher education institutions can identify these factors to design suitable teacher training programs to improve PSTs technological literacy, confidence and readiness to teach in the modern classroom.

Statement of the Problem

Technology has become a significant part of the learning process, yet there is a problem among PSTs about how technology can be applied in their future classroom instruction. Teacher education institutions provide training for technology teachers, but learning technology and having a concrete intention of its use are not connected.

Some factors that can influence PSTs' readiness to use educational technology are PU, PEOU, self-efficacy, attitude toward technology and quality of teacher education programs. If teacher preparation programs are not attuned to and address these factors, they may fall short in preparing teachers for today's digital learning contexts.

This study, therefore, investigates the factors which influence the PST's intent to practice instructional skills using the TAM.

Objectives of the Study

The objectives of the present research study are

1. To examine the influence of PU on PST's intention to use technology.
2. To analyse the impact of PEOU on their intent to use educational technologies.
3. To investigate how attitude towards technology affects their behavioural intention.

Research Hypothesis

1. PEOU is negatively related to PSTs' attitude towards using technology.
2. PU and PSTs' attitudes toward using technology have a significant positive relationship.
3. The results from this study indicated that ATUT has a significant effect on PST intention to use technology.
4. The direct effect of PEOU and PU on intention to use technology is significant.

Literature Review

How Technology is Incorporated into Teacher Education

Information and communication technologies (ICTs) have revolutionised the way teaching and learning are carried out. In today's 21st century, teachers are increasingly expected to implement digital tools to help them in their teaching, communication, assessment, and engagement tasks. In modern education, the application of technology-integrated learning environments, such as smart classrooms, mobile learning, flipped classrooms, online learning platforms, digital media, etc., plays an important role.

PST is one of the areas playing a key role in this change, because they will be teachers and will be tasked with how technology will be used in the classroom. The adoption and use of technology are affected by their access to digital tools, as well as their knowledge, confidence, and attitudes towards technology. However, in the contemporary educational environment, teachers also have to gain technological expertise, say Alayyar et al. (2012). Similarly, Mishra and Koehler (2006) essentially note that in order to be effective, teacher knowledge of technology requires being accompanied by pedagogical and content knowledge.

TAM Model

The TAM (Davis, 1989) is one of the most widely accepted models which have been used to explain users' acceptance of technology. TAM suggests that usefulness and ease of use are related to a person's willingness to use technology. The constructs of TAM are PU and PEOU. These constructs influence attitudes of users towards technology and their intention to use it.

The TAM has been applied to study the acceptance of digital technologies by teachers and students in educational contexts. Cheung and Vogel (2013) and Teo et al. (2008) used TAM to gain an understanding of how users can have a positive attitude towards the use of technology. Venkatesh et al. (2012) also pointed out that external factors can impact users' perceptions of the ease of use and usefulness of a technology. In this way, TAM provides a good theoretical foundation for studying PSTs' intentions to use educational technology.

Perceived Helpfulness and Skill Adoption

PU is the degree to which an individual believes that technology will improve his or her performance. It is the PST's confidence in the positive impact of educational technology on these three teaching and learning aspects: effectiveness, engagement, interaction, and learning outcomes, as a concept in teacher education.

PSTs with positive attitudes to technology are more likely to develop such attitudes because they think that technology helps them to be effective in their teaching. According to Davis (1989), one of the main factors which determine technology acceptance is PU. In an analogous manner, Teo (2011) discovered that PU influenced teachers' intention to use technology. If PSTs have an understanding of the practical application of educational technology in the classroom, they are more inclined to use educational technology.

Preliminary Research on the PEOU and Technology Adoption

PEOU is the extent to which someone feels an ability to perform with technology with ease or low effort. Their approach to educating with technology may more closely relate to the ease of use and accessibility of the digital tools, how they are managed, and/or the manageability of the tools.

If technology is challenging to use, PST may experience anxiety or reluctance in using technology. They can be more confident and easier to use, however, once they are trained and have had practice. Davis (1989) states that PEOU has a significant direct effect on PU and attitude towards technology. Teo et al. (2008) also reported that ease

of use is another factor that affects teachers' technology acceptance. Thus, teacher education should offer hands-on experience to facilitate the easier, more familiar use of technology for PSTs.

ATUT

ATUT is the positive or negative feelings about technology. By fostering a positive attitude, PSTs will be motivated to explore digital tools and use them in their teaching practice. Low confidence, lack of training, lack of resources and/or fear of failure are other factors that can lead to negative attitudes.

TAM assumed that attitude would be influenced by PU and PEOU and that attitude would also affect the intention to use technology (Davis, 1989). Teo (2011) also mentioned that teachers' attitude plays an important role in their intention to use technology. Therefore, fostering positive attitudes among PSTs to support technology adoption is important.

Behavioral Intention to Use Educational Technology

Behavioral intention can be described as a person's intention or willingness to perform a certain behavior. In this study, it refers to the PST's plans to implement educational technology in teaching in the future. According to TAM, attitude towards technology, PEOU, and PU are factors that impact behavioral intention.

PSTs who have positive attitudes about technology as useful, easy to use and beneficial for teaching are more likely to plan to use technology in their classroom practice. Teachers' intentions for using technology are impacted by their beliefs, attitudes and facilitating conditions as cited by Teo (2011). Similarly, Joo et al. (2018) showed that PU, PEOU and self-efficacy contribute significantly to PSTs' intention to use technology.

Barriers to the Adoption of Technology among PSTs

Educational technology offers numerous benefits, but PSTs could be encountering some barriers that would impact their intention to use educational technology. Limited access to digital tools, lack of training, poor internet facilities, low confidence and inadequate institutional support are some of these barriers. If not supported, PST may not be ready to infuse technology in their future classrooms.

In this regard, Kuzu and Günüç (2014) emphasized the importance of technology application to keep students' interest in learning. However, teachers must be prepared and confident to be able to effectively embed technology. Therefore, teacher education institutions need to plan training, resources and opportunities for PSTs to address these barriers.

Research reveals that there are some significant factors that affect PSTs' intention to use educational technology in the literature. The TAM can be used to guide these factors. ATUT influences behavioral intention and is mediated by the PU and PEOU. In addition, PSTs' self-efficacy and institutional support are also important factors in determining their readiness to use technology. In addition, self-efficacy and institutional support are important factors that influence PSTs' readiness to use technology.

The findings of the various studies carried out so far indicate that the use of educational technology is greater when PSTs believe in its expediency, ease of use and relevance to teaching. Therefore, teachers' training programmes need to focus on developing a positive attitude, confidence, and skilful use of technology to enable the future teachers to use them effectively in their classrooms.

Research Gap

The TAM has been applied in previous studies to examine teachers' and students' acceptance of educational technology. Based on the results of these studies, it can be inferred that the factors affecting the adoption of

technology are PU, PEOU, attitude and self-efficacy. However, most research to date has been done in general education settings or with in-service teachers and very little with

PSTs Who are Beginning their Teaching Careers

The choice of implementing educational technology is one that PSTs are likely to be making in the classroom, but that hasn't been fully explored in many local contexts. Especially, there is a dearth of research on PSTs' intention to use educational technology in District Sudhnoti, Azad Jammu and Kashmir. This means that the adoption of technology can be influenced by different institutional facilities, training possibilities, digital skills and local educational conditions, which means that there is a context gap.

Additionally, a considerable amount of research has been carried out on PU and PEOU, and very little research has investigated the relationship between attitude and self-efficacy and the PSTs' intentions to use technology. As such, these factors need to be explored in conjunction in the context of the TAM.

The present study aims to mitigate this by examining factors that influence pre-service teachers' intention to learn, use and implement educational technology in District Sudhnoti, AJK. This study examines PU, PEOU, attitude toward technology, self-efficacy, and behavioral intention and could offer valuable suggestions for teacher education institutions to enhance technology training and teach future teachers how to apply technology in the classroom.

Methodology

Research Design

In this study, quantitative research was used, and the survey method was applied to investigate the factors that affect PSTs' readiness to adopt educational technology. A correlational method was selected for this study since the study was designed to examine the relationships among the major constructs of the TAM, PU, PEOU, ATUT, self-efficacy and behavioral intention to use technology.

The study was based on the TAM, which states that PU and PEOU are the two most significant variables impacting technology acceptance, which further impacts attitude and behavioural intention (Davis, 1989). Thus, this design was appropriate for investigating the role that these factors play in predicting future PSTs' intentions to use technology in their future classrooms.

Population and Sample

There were 120 PSTs in teacher education programs of District Sudhnoti, AJK. The participants were chosen from a few teacher education institutes, which provided B.Ed (Hons) and 1.5-year B.Ed programs.

Sampling Technique

A census sampling technique was used because the total number of PSTs accessible was only 120. This was considered appropriate since every available subject who met the inclusion criteria was included in this study. The students who were selected for the study were the students who were enrolled in the selected institutions of the District Sudhnoti in B.Ed. (Hons) and B.Ed. 1.5-year teacher education programs.

A census approach was applied to get a more representative sample of pre-service teacher studies in the different institutions and academic semesters.

Research Instrument

The data were collected from a structured questionnaire based on the Technology Acceptance Model. The questionnaire aimed to examine the PSTs' perception, attitudes, self-efficacy, and intention to use educational technology. Responses to all items were made on a scale ranging from strongly disagree (1) to strongly agree (5). The instrument was modified based on previous studies using TAM and on the context of PST.

Validity of the Instrument

Validity is the extent to which an instrument measures what it purports to measure. The questionnaire was reviewed by two senior faculty members of the Department of Education, Mohi-ud-Din Islamic University, Nerian Sharif, AJ&K, for content validity.

The research objectives and the TAM constructs were presented to experts for comments regarding clarity, relevance, language and consistency of the questionnaire. These changes have been made to improve the wording of items and to remove ambiguity in items as a result of feedback received. This process ensured the instrument planned to measure PSTs' technology acceptance was suitable.

Pilot Study and Reliability

A preliminary study was first carried out before the final data collection to determine the clarity, suitability and reliability of the questionnaire. The pilot study was helpful in determining the possible wording and structure issues of the items.

To evaluate the internal consistency of the instrument, Cronbach's Alpha was used. Using general reliability guidelines, five items had a reliability of .709. Therefore, it was seen as reliable and suitable for the main study.

Table 1

Reliability Statistics

Cronbach's Alpha	Number of Items
.709	5

Data Collection Procedure

The data were gathered from 120 PSTs at the selected B.Ed. institutions. Program in District Sudhnoti, AJ&K. Participants were given the questionnaire after the study's purpose was explained to them. All participants had the opportunity to take the survey, and they were assured that their responses would be kept anonymous and used for research purposes only. The questionnaire was completed in person or online, depending on participants' availability and institutional access.

Data Analysis

Data collected were analysed using the Statistical Package for the Social Sciences (SPSS). Demographic data and participants' responses were summarised using descriptive statistics, including frequencies, percentages, means, and standard deviations.

Inferential analysis involved a Pearson correlation test to explore the relationships among PU, PEOU, attitude toward technology, self-efficacy, and behavioral intention. The effect of the independent variables on the dependent variable, PSTs' behavioral intention to use educational technology, was also measured using multiple regression analysis. This analysis was used to establish the force of TAM constructs on PSTs' intention to use technology in their future teaching.

Results

This section describes the study constructs. Overall, PST responses to various TAM constructs were examined using descriptive statistics. The results are shown in Table 2.

Table 2

Descriptive Statistics of Study Constructs

Construct	Mean	Std. Deviation
PU	4.43	0.24
PEOU	4.16	0.31
ATUT	4.24	0.36
BIU	4.33	0.34
AU	4.33	0.26

Table 3

Regression Summary of TAM Relationships

Relationship Tested	F-value	df	Sig.
PU → BIU	31.426	1, 118	.000
PU → PEOU	11.832	1, 118	.001
PU → ATUT	6.734	1, 118	.011
ATUT → BIU	2.101	1, 118	.150
PU + PEOU → BIU	15.631	2, 117	.000
PEOU → ATUT	31.032	1, 118	.000
AU + ATUT + PU + PEOU → BIU	13.059	4, 115	.000

Table 4

Multiple Regression Model Predicting Behavioral Intention to Use Technology

Predictor	B	Beta	Sig.
PU	.312	.412	.000
PEOU	.228	.301	< .01
ATUT	.064	—	.172
AU	.051	—	.204

Table 2 also provides the descriptive statistics of PSTs' perceptions towards the use of educational technology, which is generally positive. The mean scores of all constructs were in the high domain, ranging from 4.16 to 4.43. PST showed a high level of confidence in the usefulness of technology as a means to teaching and learning, with the highest mean score ($M = 4.43$, $SD = 0.24$) obtained among the PU items. The mean scores of BIU ($M = 4.33$) and AU ($M = 4.33$) were high; thus, the respondents had high intentions to use the educational technology and had already used digital technology in educational activities. PEOU received the lowest mean score ($M = 4.16$, $SD = 0.31$) and was still high. This finding indicates that the subjects did not encounter too many problems in using educational technology.

The regression results, which are presented in Table 3, show that the variable PU was a significant predictor of the variable Behavioral Intention to Use educational technology, $F(1,118) = 31.426$, $p < .001$. The result suggests that PSTs who had a positive perception of the usefulness of technology were more aware of the teaching practice

they were going to engage in in the future. PU was also a significant influence on PEOU, $F(1,118) = 11.832$, $p = .001$, in that those who perceived technology as useful perceived it as being easier to use.

Additionally, the PU was a significant predictor of Attitude Toward Using Technology, $F(1,118) = 6.734$, $p = .011$. This clearly shows that usefulness is one of the factors influencing positive attitudes towards the use of educational technology. The results also indicated that the PEOU had a significant effect on attitude towards using technology, $F(1, 118) = 31.032$, $p < .001$. Moreover, the PST who were easy to use technology tended to have positive attitudes regarding technology's use.

The relationship between the variables of ATUT and BIU, however, was not statistically significant, $F(1,118) = 2.101$, $p = .150$. In this study, it seems that attitude was not a significant predictor of PSTs' intentions to use educational technology. Attitude can be a positive contributing factor to technology acceptance; however, this was not sufficient to explain behavioural intention independently.

The results of the final multiple regression model predicting BIU technology are presented in Table 4. The overall model was statistically significant, $F(4,115) = 13.059$, $p < .001$. This means that the group of predictors gave a significant account of the variance of PSTs' preparedness to adopt educational technology. Only one strong, significant predictor of BIU was PU, $B = .312$ and $Beta = .412$. This means that the focus of PSTs' technology intention was maximizing usefulness.

PEOU was also a significant predictor of BIU with a $B = .228$ and $Beta = .301$. The result shows that there was a correlation between the ease of use of technology and attitudes of PSTs towards using technology in their future teaching. The remaining variables (ATUT and AU) were not predictive of the final model. While both variables had positive coefficients, neither was statistically significant.

In general, the results validate the key assumptions presented in the Technology Acceptance Model. The most important factors influencing PSTs' BIU educational technology were discovered to be PU and PEOU. The results suggest that PSTs will be more likely to use technology when they think it will enable them to be better teachers and that it will be easy for them to use. Therefore, the teacher preparation program must provide practical experiences, contextual learning, and support for PST's to develop their confidence and preparedness to teach in technology-rich classrooms.

Discussion

This study was conducted to explore factors influencing PSTs' intention to use educational technology within the Technology Acceptance Model. The findings showed positive perceptions held by PSTs; all the constructs had high mean scores. This means that, generally, the respondents had a positive attitude towards the use of technology in education, regarding its usefulness, ease of use, and relevance to their future pedagogical activities.

From the descriptive results, it was seen that the mean of the PU was the highest. This indicates that the PSTs were very confident that educational technology can positively affect teaching and learning. This finding is interesting as it correlates with Davis (1989), who found PU to be one of the most significant factors in determining whether or not a user is going to accept a technology. PSTs who believe that technology can enhance how they teach, how they engage and interact with students, and student learning will be more likely to have a strong intention to use technology in their future classrooms.

The results of the regression analysis also revealed that the PU variable was significant in predicting the BIU technology. It suggests that the PSTs who felt it was a useful technology were more likely to intend to incorporate it in their lessons. This result aligns with the results of the previous studies, which found that PU was one of the

strongest determinants of technology acceptance in the educational context (Teo, 2011). Therefore, the teacher preparation programs should teach the PSTs about the positive impact of technology on classroom teaching.

The study also showed that the construct of “PEOU” was a significant variable for the construct “Attitude Toward Using Technology”. This indicates that the easier technology was to use, the more positive attitudes PSTs had toward the use of technology. Also in line with the TAM, which states that ease of use affects attitudes toward and acceptance of technology. This discovery highlights the importance of hands-on learning and experience, and the availability of readily available digital devices for teachers in training. PSTs with a negative attitude toward technology may lack confidence in technology. PSTs with a negative attitude toward technology may lack confidence in using the technology.

Two-way regression analysis revealed that PU and PEOU were significant in explaining the technology use Behavioral Intention to Use. This demonstrates that both constructs are very important in PSTs' plans to use educational technology. PU seemed to be the better predictor, however. This means ease of use is one consideration, but PSTs will be more likely to use technology when they think it's educational.

Surprisingly, ATT was not found to be a significant predictor of the BI in this study. While overall attitudes were quite positive, attitudes were not sufficiently strong to explain PSTs' intention to use technology. This also indicates that intention is more directly related to practical beliefs (usefulness and ease of use) than to attitude. The same was true for the final model, where AU was not a significant predictor of Behavioural Intention. That is, knowing a technology does not necessarily mean that it will be utilized in the future, unless PST also believes that the technology is useful and easy to use.

In general, all the results showed that the Technology Acceptance Model was applicable to the study on the use of technology in PST. The results suggest that the effect of cognitive beliefs (PU and PEOU) is stronger than the effect of attitude and AU on determining behavioural intentions. The findings of this study suggest that teacher education institutions must not only provide access to technology, but must also make PST aware of the utility and role of technology in improving teaching and learning.

Conclusion

The study used the Technology Acceptance Model (TAM) to investigate the factors influencing the intention to use educational technology for the PSTs. The results indicated that the mean scores of all scales are high for PSTs, who have positive perceptions of PU, PEOU, Attitude Toward Using Technology, Behavioral Intention to Use and AU.

Results showed that PUI was a significant influence on BI of technology. This indicates that PSTs may have a more positive outlook in terms of planning to use technology as part of their teaching and learning process if they feel it would be beneficial for enhancing learning and teaching. Another parameter that was found to play a significant role is PEOU, which primarily affects positive attitudes towards technology. The easier technology is to use, the more positive the attitude of the PSTs will be towards the technology.

Last, the regression results showed that two constructs, PU and PEOU, accounted for the most variance in predicting BIU technology. ATUT and AU were not significant predictors in the final model, however. Results revealed that attitudes of PSTs towards the use of educational technology and their previous experiences do not have a significant influence on the intention to use it, but PU and ease of use do.

Conclusions are made that the Technology Acceptance Model will explain PSTs' intention to use educational technology. Therefore, teacher education institutions should seek to enhance PSTs' knowledge of technology's advantages and provide training to make it easier to use. Institutions can help build PSTs' readiness to integrate technology into their future classrooms by boosting the PU and ease of use of technology.

Recommendations

The results indicate that teacher education institutions need to provide PSTs with practical technology training to prepare them. Technical skills are not the only element they must be trained on, but also the possibility of using technology to support teaching and student learning.

In the classroom, during lesson preparation, microteaching and teaching practice, PSTs need to be given more opportunities to apply educational technology. It can help them gain confidence and realise the value of technology in real classrooms.

A variety of user-friendly digital tools, internet access and technical support should be available in the institutions. When the technology can be easily accessed and is easy to use, PSTs are more likely to have positive attitudes and intentions to use the technology.

It is also possible to conduct further studies in the future with a larger number of samples from other districts or provinces. Interviews are also a qualitative approach for discussing PSTs' experiences, challenges, and perceptions regarding the incorporation of educational technology.

Ethical Reflection

The participants in the study were informed that their participation was voluntary, anonymous and confidential. Data analysis and honesty in reporting were observed, as was the concealment of participants' identities.

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