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Technology Acceptance among English Pre-service Teachers: A Path Analysis Approach

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Abstract

Incorporating technology in English language teaching practices has the potential to generate more lively and captivating learning experiences for learners. The challenge lies in adequately equipping pre-service English language teachers with the skills to seamlessly incorporate technology in their teaching methods and improve students' academic performance, despite their favorable perception of its usefulness. The study aimed to shed light on the factors that contribute to pre-service teachers' acceptance of technology and to determine the applicability of the Technology Acceptance Model in the context of English language Teaching (ELT). For this study, the framework developed by Teo (2009) was utilized. The participants were 286 English pre-service teachers. The study identified 21 pairs of factors that positively and significantly affect technology acceptance, with Perceived Usefulness having the highest correlation coefficient and Facilitating Conditions having the lowest. The path analysis of the technology acceptance model revealed that while the model was a good fit for this study, there were two non-significant paths. Perceived Ease of Use and Perceived Usefulness were found to directly affect technology acceptance, while Technological Complexity and Facilitating Conditions had indirect effects through Perceived Ease of Use and Perceived Usefulness. The results of this study showed that interventions to improve technology acceptance amongst pre-service teachers should take into account direct and indirect factors.

Keywords: English pre-service teacher, technology acceptance, technology acceptance model

1. Introduction

The rapid advancement of technology has had a significant impact on the educational landscape, offering various opportunities to improve teaching and learning experiences. The effective integration of educational technology into classrooms, however, largely depends on the acceptance and willingness of pre-service teachers to use these tools. Research suggests that teachers' attitudes towards technology are crucial in determining its successful implementation in educational settings (Ertmer, 2005; Teo, 2009). Despite the potential benefits of educational technology and its increasing availability, some pre-service teachers may be hesitant to adopt and utilize these tools in their future teaching practices (Teo, Su Luan, & Sing, 2008).

Similar to other subject areas, the use of technology has become increasingly important in English language teaching (ELT) in recent years, offering new and innovative ways for both teachers and students to engage with the language. By incorporating computer-assisted language learning (CALL), mobile learning, online resources and tools, and virtual and augmented reality technologies, ELT can provide interactive, multimedia-based activities that enable students to practice all four language skills (reading, writing, listening, and speaking). CALL, according to Warschauer and Healey (1998), can help students develop autonomy and self-directed learning skills. Kukulska-Hulme and Shield (2008) suggest that mobile learning can provide opportunities for collaborative learning and communication, while Stockwell (2010) argues that online resources can help students become more independent learners and provide opportunities for personalized learning. Virtual and augmented reality technologies can also provide immersive language learning experiences that can help students improve their speaking and listening skills, as well as their intercultural competence (Dalgarno & Lee, 2010). The integration of technology into ELT practices can help create more dynamic and engaging learning experiences for students.

The preparation of pre-service teachers in using technology is, therefore, crucial for successful integration of technology in English language teaching (ELT) practices. According to Ertmer (2005) and Teo (2009), teachers' attitudes and perceptions towards technology can significantly impact the adoption and use of technology in teaching practices. Therefore, the pre-service teacher training programs should focus on providing opportunities for pre-service teachers to develop their technological pedagogical content knowledge (TPCK), or the knowledge of how to effectively use technology to enhance teaching and learning (Mishra & Koehler, 2006). As noted by Teo, Su Luan, and Sing (2008), some pre-service teachers may not possess the necessary confidence and competence to use technology while teaching, and this lack of preparedness can be detrimental to their ability to successfully integrate technology into in their future teaching practice. Hence, teacher education programs should emphasize the development of TPCK and provide pre-service teachers with opportunities to apply their technological knowledge and skills in practical teaching settings. By doing so, pre-service teachers will be better equipped to integrate technology into their ELT practices and improve students' learning outcomes.

The purpose of this research was to investigate the factors influencing English pre-service teachers' acceptance of technology in their teaching practices, using Teo's (2009) Technology Acceptance Model (TAM) as a framework. Specifically, this research sought to provide insight into the factors that contribute to pre-service teachers' technology acceptance and the extent to which the TAM model can be applied in the context of English language teaching (ELT).

2. Literature Review

Several studies have explored the acceptance of technology by pre-service English language teachers. These studies have employed various models and frameworks, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), to investigate the factors influencing pre-service English teachers' technology adoption in their future teaching practices. Teo, Luan, and Sing (2008) applied the TAM to investigate the intention to use technology among pre-service teachers in Singapore and Malaysia, focusing on their perceptions of ease of use and usefulness of technology. Their study highlighted the importance of considering cultural differences when examining pre-service teachers' technology acceptance. Several studies demonstrate the importance of understanding English language teachers' technology acceptance, as well as the factors that influence their adoption and use of technology in teaching. By addressing these factors, educators and policymakers can better support language teachers in effectively integrating technology into their teaching practices (Al-Senaidi, Lin, & Poirot, 2009; Gilakjani, 2017; Liu & Szabo, 2009; Nim Park & Son, 2009). A study performed by Teo (2009) found that pre-service teachers' Perceived Ease of Use (PEU) and Perceived Usefulness (PU) were significant predictors of their attitude towards computer use, and in turn, their attitude towards computer use was a significant predictor of their Behavioral Intention (BU) to use computers. Additionally, this study offers valuable insights into the factors that contribute to pre-service teachers' acceptance of technology and their intentions to use it in their future teaching practice. By understanding these factors, teacher education programs can be better designed to support pre-service teachers in effectively integrating technology into their classrooms.

In addition to studies showing the importance of technology acceptance by pre-service teachers, other studies have demonstrated the benefits technology use in the classroom can have on learners, and these studies illustrate why it is important for pre-service teachers to accept the use of technology in their teaching practice. One such study involved the use of social media. Reinhardt (2019) defines social media as applications or technology that enable users to interact with one another in digital networks where they can create and share ideas, media, and practices. Kaplan and Haenlein (2010) identified six varieties of social media: collaborative projects, blogs, content communities, social networking sites, virtual game worlds, and virtual social worlds. Each of these examples requires collaborative interaction between users, and the global nature of social media allows for these interactions to take place over great distances, beyond cultural and geographical barriers. Furthermore, these technologies enable learners to engage in learning outside of classroom contexts. Thanks to these technologies, language learners are able to interact with native speakers and non-native speakers alike. Jabbari and Eslami (2018) studied the effects of massively multiplayer online games (MMOGs) on second language learning, and they observed how online platforms provide users with the opportunity to use language in creative and spontaneous ways outside of a structured classroom environment. Jabbari and Eslami recognized that by playing these virtual games, second language learners were able to develop their vocabulary and communicative skills, especially when given the opportunity to play with native English speakers (NES). While teachers do not necessarily need to incorporate MMOGs into their teaching practice, social media certainly offers unique opportunities for learners to interact with others in largely safe, anxiety-free environments. Furthermore, this study demonstrates how integrating technology into the classroom can be used to benefit English language

learners; however, teachers who hold reservations towards the use of technology in the classroom may avoid taking advantage of social media and other forms of technology to the detriment of their students' language development. Finally, studies such as the one discussed above reiterate the importance of technology acceptance among pre-service teachers.

Despite the potential benefits of integrating educational technology into English language teaching (ELT), some pre-service teachers may be hesitant to adopt and utilize these tools in their future teaching practices. Research suggests that the successful implementation of technology in educational settings largely depends on pre-service teachers' acceptance and willingness to use these tools, as well as their technological pedagogical content knowledge (TPCK). However, some pre-service teachers may lack confidence and competence in using technology, which can be detrimental to the success of technology integration. Several studies (Al-Senaidi et al., 2009; Aypay, Celik, Aypay, & Sever, 2012; Gilakjani, 2017; Liu & Szabo, 2009; Nim Park & Son, 2009) have explored the factors that influence pre-service English language teachers' adoption and use of technology in teaching, including their attitudes and perceptions towards technology, their cultural differences, and their perceived ease of use and usefulness of technology. They revealed that the pre-service teachers perceived technology as useful and had a favorable attitude towards the use of technology in education. The problem, therefore, is how to effectively prepare pre-service English language teachers to integrate technology into their teaching practices and enhance students' learning outcomes.

2.1 Factors Influencing Pre-service English Teachers' Acceptance of Technology

Several factors have been identified as influential in pre-service English teachers' acceptance of technology in their teaching practices. These factors include their attitudes and perceptions towards technology, their technological pedagogical content knowledge (TPCK), and the use of technology models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Churchill, Lu, Chiu, & Fox, 2015; Koehler & Mishra, 2009; Teo, 2009; Teo et al., 2008; Venkatesh, Morris, Davis, & Davis, 2003).

Attitudes and perceptions towards technology play a crucial role in determining pre-service teachers' willingness to use technology in their teaching practice. Ertmer (2005) and Teo (2009) emphasize the importance of teachers' attitudes towards technology as a critical factor in determining the successful implementation of technology in educational settings. Teo et al. (2008) found that pre-service teachers' perceived usefulness and perceived ease of use were significant predictors of their attitudes towards computer use, which in turn was a significant predictor of their behavioral intention to use computers in their teaching practices.

Technological pedagogical content knowledge (TPCK) is also an essential factor that influences pre-service teachers' acceptance of technology. TPCK refers to the knowledge of how to effectively use technology to enhance teaching and learning (Mishra & Koehler, 2006). As noted by Teo et al. (2008), some pre-service teachers may not possess the necessary confidence and competence to use technology in their future teaching practice, and this lack of preparedness can be detrimental to the success of technology integration. Park (2009) concluded that perceived usefulness and perceived ease of use are important factors in determining students' behavioral intention to use e-learning, and that the prior experience of students with e-learning can also influence their behavioral intention.

Finally, the use of technology models such as the TAM and UTAUT can provide valuable insights into pre-service English teachers' technology acceptance. Teo et al. (2008) applied the TAM to investigate the intention to use technology among pre-service teachers in Singapore and Malaysia, focusing on their perceptions of ease of use and usefulness of technology. The study highlighted the importance of considering cultural differences when examining pre-service teachers' technology acceptance. Similarly, Al-Senaidi et al. (2009) used the UTAUT model to investigate pre-service teachers' acceptance of technology in Oman, finding that performance expectancy, effort expectancy, and social influence were significant predictors of technology acceptance.

In summary, pre-service English teachers' attitudes and perceptions towards technology, their TPCK, and the use of technology models such as the TAM and UTAUT are all crucial factors that influence their acceptance and use of technology in their teaching practices. By understanding these factors, teacher education programs can better prepare pre-service teachers to effectively integrate technology into their ELT practices and improve students' learning outcomes.

2.2 Teacher Acceptance Model

The Teacher Acceptance Model (TAM) is an adaptation of the Technology Acceptance Model (Davis, 1989), which has been widely used to understand and predict users' acceptance of technology. The Technology Acceptance Model (TAM) posits that Perceived Ease of Use (PEU) and Perceived Usefulness (PU) are the primary determinants of users' Behavioral Intention (BI) to adopt and use technology, which in turn influences their actual technology usage (Legris, Ingham, & Collerette, 2003). In the context of education, the Teacher Acceptance Model has been employed to investigate teachers' acceptance and adoption of educational technology (Teo, 2009; Teo et al., 2008).

In the Teacher Acceptance Model (TAM), Perceived Ease of Use (PEU) pertains to a teacher's perception of the level of effort required to use a particular technology in their teaching practice (Davis, 1989). Perceived Usefulness (PU), on the other hand, pertains to a teacher's perception that utilizing a specific technology will improve their job performance (Davis, 1989). Several studies have demonstrated the importance of these factors in predicting teachers' intentions to use technology in their classrooms (Ertmer, 2005; Teo, 2009).

Additional factors have been incorporated into the Teacher Acceptance Model (TAM) to better understand the unique context of educational technology adoption. These factors include teachers' Self-Efficacy (SE), Subjective Norms (SN), Facilitating Conditions (FC), and pedagogical beliefs (Teo, 2009; Teo et al., 2008). For instance, teachers' Self-Efficacy (SE), or their belief in their ability to use technology effectively, has been shown to influence their intention to use technology in the classroom (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012).

By examining the relationships between these factors, the Teacher Acceptance Model (TAM) provides valuable insights into the barriers and facilitators of technology adoption in educational settings. These insights can inform the design of professional development programs and interventions aimed at promoting teachers' acceptance and effective use of educational technology.

Teo (2009) developed a framework based on the Technology Acceptance Model (TAM) to investigate pre-service teachers' acceptance of technology and their intentions to use it in their future teaching practice. The objective of the study was to explore the factors that may impact the adoption of technology by pre-service teachers, as this is a crucial aspect for the successful integration of technology in classrooms. The framework consisted of the following constructs:

Perceived Ease of Use (PEOU): The degree to which pre-service teachers believe that using a specific technology would be free of effort.

Perceived Usefulness (PU): The extent to which pre-service teachers believe that using a particular technology will enhance their job performance.

Attitude Towards Computer Use (ATCU): Pre-service teachers' overall affective reaction towards using computers in their teaching practice.

Behavioral Intention to Use Computers (BIUC): Pre-service teachers' intention to use computers in their future teaching practice.

External variables (Venkatesh & Davis, 2000; Morris & Venkatesh, 2000) were also included in the framework to examine their influence on the main TAM constructs:

Facilitating Conditions (FC): Concern environmental factors impacting pre-service teachers' willingness to use technology in their teaching practice.

Technical Complexity (TC): Pre-service teachers' perceptions concerning their ability to understand and use technology in their teaching practice.

Computer Self-efficacy (CSE): Pre-service teachers' belief in their ability to use technology effectively.

Subjective Norm (SN): The perceived social pressure to use technology in the teaching practice.

Computer Anxiety (CA): The level of uneasiness or apprehension experienced by pre-service teachers when using or considering using computers.

Following the framework, Perceived Ease of Use (PEU) and Perceived Usefulness (PU) are hypothesized to influence attitude towards computer use, which in turn affects behavioral intention to use computers. Additionally, computer Self-Efficacy (SE) and Subjective Norms (SN) are hypothesized to impact Perceived Usefulness (PU), while computer anxiety is hypothesized to influence perceived ease of use.

3. Research Methodology

This study aimed to contribute to the understanding of English pre-service teachers' technology acceptance in education. The study used a path analysis approach to identify the direct and indirect effects of various factors on pre-service teachers' attitudes towards technology acceptance in education.

3.1 Participants

The participants in this study were 286 English pre-service teachers from Naresuan University. The participants were selected using a convenience sampling technique. Ethical considerations were taken into account during the study. Participants were informed about the nature and purpose of the study and were asked to provide informed consent before participating. All data was treated confidentially, and participants were assured that their responses would not be shared with any third parties.

3.2 Research Instrument

The current study used a self-administered questionnaire to collect data from pre-service teachers. The questionnaire was adapted from Teo (2009) and consisted of two sections. The first section measured pre-service teachers' perceptions of the usefulness and ease of use of technology in education. The second section measured pre-service teachers' intentions to use technology in education. The questionnaire consisted of 30 items that were rated on a 5-point Likert scale.

3.3 Data Collection and Data Analysis

The collected data was analyzed using a path analysis approach. Path analysis is a statistical technique that allows for the examination of complex relationships between multiple variables. The analysis involved the development of a path model that identified the direct and indirect effects of the factors on pre-service teachers' technology acceptance. The path model was tested using Structural Equation Modeling (SEM) techniques. SEM allowed for the estimation of relationships between multiple variables simultaneously.

4. Findings

The objective of this study was to enhance the comprehension of technology acceptance in education among English pre-service teachers. The study employed a path analysis method to determine the direct and indirect impacts of several factors on pre-service teachers' attitudes towards technology acceptance in education. The findings of the study are as follows:

Table 1. The analysis of Pearson correlation coefficient between factors that affect technology acceptance.

Variables	SN	TC	FC	PEU	PU	ATCU
SN	1.000					
TC	.349**	1.000				
FC	.639**	.469**	1.000			
PEU	.411**	.360**	.383**	1.000		
PU	.316**	.298**	.177*	.510**	1.000	
ATCU	.470**	.437**	.400**	.516**	.768**	1.000

**statistically significant difference at the .01 level.

*statistically significant difference at the .05 level.

The Table shows the correlation coefficients between six variables: Subjective Norm (SN), Technological Complexity (TC), Facilitating Conditions (FC), Perceived Ease of Use (PEU), Perceived Usefulness (PU), and Technology Acceptance (ATCU). From Table 1, it is found that there are 21 pairs of factors affecting technology acceptance that have correlations ranging from 0.177 to 0.768, which are positive relationships and statistically significant at the .01 level for all pairs. When considering the highest correlation coefficient of factors affecting technology acceptance, the Perceived Usefulness (PU) factor has a correlation coefficient equal to 0.768. In contrast, the factor with the lowest impact on technology acceptance is the Facilitating Conditions (FC) factor, with a correlation coefficient equal to 0.400.

Table 2. Path analysis of the research model

Effect variables	PU			PEU			ATCU		
Cause variables	TE	IE	DE	TE	IE	DE	TE	IE	DE
SN	0.128 (0.080)	-	0.128 (0.080)	-	-	-	0.083 (0.051)	0.083 (0.051)	-
TC	0.101* (0.042)	0.101* (0.042)	-	0.221** (0.084)	-	0.221** (0.084)	0.214** (0.060)	0.218* (0.108)	-0.004 (0.106)
FC	0.136** (0.041)	0.136** (0.041)	-	0.297** (0.075)	-	0.297** (0.075)	0.294** (0.064)	0.294** (0.064)	
PU	-	-	-	-	-	-	0.645** (0.051)	-	0.645** (0.051)
PEU	0.458** (0.073)	-	0.458** (0.073)	-	-	-	0.989** (0.214)	0.295** (0.054)	0.694** (0.217)
Chi-square = 6.237, df = 3, p-value = 0.1006									
RMSEA = 0.089, CFI = 0.986, TLI = 0.943, SRMR = 0.029									
Structural equation	PU			PEU			ATCU		
R^2	0.199			0.273			0.352		

The table shows the results of a path analysis examining the direct and indirect effects of several variables on Technology Acceptance (ATCU) through the perceived usefulness (PU) and perceived ease of use (PEU) factors. The values in parentheses represent the standard errors of the estimates.

It is found that Perceived Usefulness (PU), Technological Complexity (TC), and Facilitating Conditions (FC) have indirect effects on Technology Acceptance (ATCU) through the mediators Perceived Usefulness (PU) and Perceived Ease of Use (PEU). The factor with the highest direct effect on ATCU is PEU (0.694, $p<0.01$), followed by PU (0.645, $p<0.01$). The indirect effects of Technological Complexity (TC) and Facilitating Conditions (FC) through Perceived Ease of Use (PEU) and Perceived Usefulness (PU) are also statistically significant.

The A path analysis of the technology acceptance model is found to be significantly consistent with the empirical data at the .01 level based on several statistical measures of model fit, including a non-significant chi-square statistic. The R-squared values for the structural equation model indicate that Perceived Usefulness (PU) and Perceived Ease of Use (PEU) together account for 47.2% of the variance in Technology Acceptance (ATCU).

Overall, the results suggest that both Perceived Usefulness (PU) and Perceived Ease of Use (PEU) are important factors influencing technology acceptance, and that the effects of other variables such as Perceived Usefulness (PU), Technological Complexity (TC), and Facilitating Conditions (FC) are mediated by these two factors. The findings have implications for the design and implementation of technology systems, as well as for future research in this area.

From Table 2, it is found that the path analysis of the technology acceptance model is significantly consistent with the empirical data at the .01 level, as evidenced by the Chi-square statistic of 6.237 with df = 3 and a p-value of 0.1006, which is not statistically significant. Additionally, the RMSEA value is 0.089, CFI is 0.986, TLI is 0.943, and SRMR is 0.029, which are in line with the statistical measures of model fit. Upon considering the structural accuracy of the A path analysis of the technology acceptance model, it is found to be not statistically significant because there are two non-significant paths in terms of statistical significance. The results are as follows:

4.1 Factors Influencing Technology Acceptance (ATCU)

When considering the factors that have a direct effect (DE) on Technology Acceptance (ATCU), it is found that Perceived Ease of Use (PEU) and Perceived Usefulness (PU) have a direct influence, with Factor loading values of 0.694 and 0.645, respectively, which are statistically significant at the .01 level. However, Technological Complexity (TC) has a direct influence that is not statistically significant.

In addition to the factors that have an indirect effect (IE) on Technology Acceptance (ATCU), Technological Complexity (TC) has an indirect influence through Perceived Ease of Use (PEU) and Perceived Usefulness (PU) with a total influence equal to 0.214, which is statistically significant at the .05 level. Facilitating Conditions (FC) have an indirect influence through Perceived Ease of Use (PEU) and Perceived Usefulness (PU) with a total influence equal to 0.294, which is statistically significant at the .01 level.

4.2 Factors Influencing Perceived Ease of Use (PEU)

When considering the factors that have a direct effect (DE) on Perceived Ease of Use (PEU), it is found that Technological Complexity (TC) and Facilitating Conditions (FC) have a direct influence, with Factor loading values of 0.221 and 0.297, respectively, which are statistically significant at the .01 level.

4.3 Factors Influencing Perceived Usefulness (PU)

When considering the factors that have a direct effect (DE) on Perceived Usefulness (PU), it is found that Perceived Ease of Use (PEU) has a direct influence, with a Factor loading value of 0.458, which is statistically significant at the .01 level. However, Subjective Norm (SN) has a direct influence that is not statistically significant.

In addition to the factors that have an indirect effect (IE) on Perceived Usefulness (PU), Technological Complexity (TC) has an indirect influence through Perceived Ease of Use (PEU) with a total influence equal to 0.101, which is statistically significant at the .05 level. Facilitating Conditions (FC) have an indirect influence through Perceived Ease of Use (PEU) with a total influence equal to 0.136, which is statistically significant at the .01 level.

This figure presents a path analysis of the Technology Acceptance Model regarding technology acceptance by English pre-service teachers.

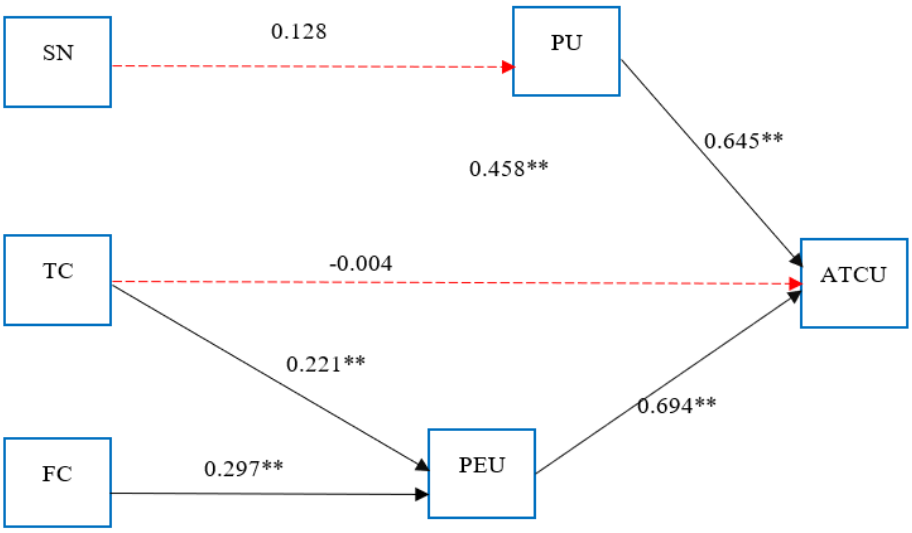

Figure 1. A Path Analysis Model of TAM by English Pre-service Teachers

5. Discussion

The study found that there are 21 pairs of factors affecting technology acceptance with correlations ranging from 0.177 to 0.768, which are positive relationships and statistically significant at the .01 level. Perceived Usefulness (PU) has the highest correlation coefficient, while Facilitating Conditions (FC) has the lowest. The path analysis of the technology acceptance model is consistent with the empirical data, showing a good model fit. However, there are two non-significant paths in terms of statistical significance.

Factors directly affecting Technology Acceptance (ATCU) include Perceived Ease of Use (PEU) and Perceived Usefulness (PU), both statistically significant at the .01 level. Technological Complexity (TC) and Facilitating Conditions (FC) have indirect influences on technology acceptance through Perceived Ease of Use (PEU) and Perceived Usefulness (PU). For Perceived Ease of Use (PEU), both Technological Complexity (TC) and Facilitating Conditions (FC) have a direct influence, with statistically significant factor loading values. For

Perceived Usefulness (PU), Perceived Ease of Use (PEU) has a direct influence, which is statistically significant, while Subjective Norm (SN) does not have a statistically significant direct influence. Both Technological Complexity (TC) and Facilitating Conditions (FC) have indirect influences on Perceived Usefulness (PU) through Perceived Ease of Use (PEU).

The findings of the study presented above are in line with related research on technology acceptance. The positive relationships between factors affecting technology acceptance, such as Perceived Ease of Use (PEU) and Perceived Usefulness (PU), have been widely discussed and confirmed in previous studies (Davis, 1989; Venkatesh & Davis, 2000).

Davis (1989) proposed the Technology Acceptance Model (TAM) and highlighted the critical role of Perceived Ease of Use (PEU) and Perceived Usefulness (PU) in predicting users' acceptance and usage behavior of technology. This study's results support the central role of Perceived Ease of Use (PEU) and Perceived Usefulness (PU) in technology acceptance, as they were found to have significant direct effects on Technology Acceptance (ATCU).

In a study by Venkatesh and Davis (2000), they extended the TAM to include external variables, such as Technological Complexity (TC) and Facilitating Conditions (FC), which influence users' perceptions of ease of use and usefulness. The current study's findings also support the importance of these external factors in technology acceptance, showing both direct and indirect influences on Perceived Ease of Use (PEU) and Perceived Usefulness (PU).

The influence of Subjective Norm (SN) on Technology Acceptance (ATCU) has been widely debated in the literature. While some studies have found a significant impact of Subjective Norm on Technology Acceptance (ATCU) (e.g., Venkatesh & Morris, 2000), others have reported non-significant results (e.g., Legris, Ingham, & Collerette, 2003). The current study found that Subjective Norm (SN) did not have a statistically significant direct influence on Perceived Usefulness (PU), adding to the mixed findings in the literature.

Moreover, the findings discussed above are in line with Teo's (2009) teacher technology acceptance model, which highlights the importance of Perceived Usefulness (PU) and Perceived Ease of Use (PEU) in shaping technology acceptance, as well as the role of external factors such as social and organizational support. The model also emphasizes the role of attitude and subjective norms in shaping the intention to use technology, which in turn affects actual use. These findings have important implications for teacher education programs and professional development initiatives aimed at promoting technology integration in classrooms.

In summary, the current study's findings support the importance of Perceived Ease of Use (PEU), Perceived Usefulness (PU), Technological Complexity (TC), and Facilitating Conditions (FC) in understanding technology acceptance. These findings are in line with prior research, such as the Technology Acceptance Model (TAM) by Davis (1989) and Teo (2009) and its extensions (Venkatesh & Davis, 2000).

6. Conclusion

The implications of this study are twofold. Firstly, the study provides insights into the factors that influence the acceptance of technology among pre-service teachers. This information can be used to inform the development of training programs that aim to improve pre-service teachers' technology acceptance. Secondly, the study highlights the importance of addressing the indirect effects of factors on technology acceptance, particularly through perceived ease of use and perceived usefulness. This suggests that interventions to improve technology acceptance should not only focus on direct factors but also consider indirect factors.

Moreover, the results of the study suggest that facilitating conditions have the lowest impact on technology acceptance. This indicates that interventions aimed at increasing the availability and accessibility of technology may not be sufficient to improve technology acceptance among pre-service teachers. Instead, interventions should focus on enhancing pre-service teachers' perceived usefulness and ease of use of technology, as these factors have a stronger influence on technology acceptance.

Overall, the findings of this study have important implications for educational institutions and policymakers in developing effective strategies to promote technology integration in teaching and learning. The study suggests that efforts to promote technology acceptance should focus on addressing the indirect effects of external factors and improving pre-service teachers' perceptions towards the usefulness and ease of use of technology. Additionally, future research can build on these findings by examining the effectiveness of interventions designed to improve technology acceptance among pre-service teachers.

References

Al-Senaidi, S., Lin, L., & Poirot, J. (2009). Barriers to adopting technology for teaching and learning in Oman. *Computers & Education, 53*(3), 575-590. https://doi.org/10.1016/j.compedu.2009.03.015

Aypay, A., Celik, H. C., Aypay, A., & Sever, M. (2012). Technology Acceptance in Education: A Study of Pre-Service Teachers in Turkey. *Turkish Online Journal of Educational Technology-TOJET, 11*(4), 264-272.

Churchill, D., Lu, J., Chiu, T. K., & Fox, B. (2015). *Mobile learning design: Theories and application*: Springer. https://doi.org/10.1007/978-981-10-0027-0

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly,* 319-340. https://doi.org/10.2307/249008

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational technology research and development, 53*(4), 25-39. https://doi.org/10.1007/BF02504683

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education, 59*(2), 423-435. https://doi.org/10.1016/j.compedu.2012.02.001

Gilakjani, A. P. (2017). A review of the literature on the integration of technology into the learning and teaching of English language skills. *International Journal of English Linguistics, 7*(5), 95-106. https://doi.org/10.5539/ijel.v7n5p95

Jabbari, N., & Eslami, Z. R. (2018). Second language learning in the context of massively multiplayer online games: A scoping review. *ReCALL,* First View, 1-22. https://doi.org/10.1017/S0958344018000058

Kaplan, A.M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons, 53*, 59-68. https://doi.org/10.1016/j.bushor.2009.09.003

Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary issues in technology and teacher education, 9*(1), 60-70.

Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & management, 40*(3), 191-204. https://doi.org/10.1016/S0378-7206(01)00143-4

Liu, Y., & Szabo, Z. (2009). Teachers' attitudes toward technology integration in schools: A four-year study. *Teachers and Teaching: theory and practice, 15*(1), 5-23. https://doi.org/10.1080/13540600802661295

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record, 108*(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Morris, M.G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: implications for a changing workforce. *Personal Psychology, 53*(4), 375-403. https://doi.org/10.1111/j.1744-6570.2000.tb00206.x

Nim Park, C., & Son, J.-B. (2009). Implementing computer-assisted language learning in the EFL classroom: Teachers' perceptions and perspectives. *International Journal of Pedagogies and Learning, 5*(2), 80-101. https://doi.org/10.5172/ijpl.5.2.80

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Journal of Educational Technology & Society, 12*(3), 150-162.

Reinhardt, J. (2019). Social media in second and foreign language teaching and learning: Blogs, wikis, and social networking. *Language Teaching, 52*(1), 1-39. https://doi.org/10.1017/S0261444818000356

Teo, T. (2009). Modelling technology acceptance in education: A study of pre-service teachers. *Computers & Education, 52*(2), 302-312. https://doi.org/10.1016/j.compedu.2008.08.006

Teo, T., Luan, W. S., & Sing, C. C. (2008). A cross-cultural examination of the intention to use technology between Singaporean and Malaysian pre-service teachers: an application of the Technology Acceptance Model (TAM). *Journal of Educational Technology & Society, 11*(4), 265-280.

Venkatesh, V., & Davis, F.D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science, 46*(2), 186-204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly,* 425-478. https://doi.org/10.2307/30036540