Factors Affecting Pre-service Teachers' Acceptance of Online Learning to Promote Social Distancing

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Abstract

The outbreak of the novel Coronavirus disease (COVID-19), which was declared a global pandemic on 11 March 2020, has upended the world. To combat its spread, social distancing was adopted as recommended by health professionals and the higher education institutions (HEIs) were not spared. Despite the continuation of the academic agenda, social distancing forced lecturers and their students apart. As a result, the goal of this study was to examine factors that influence pre-service teachers' acceptance of online learning to promote social distancing. The study used a quantitative design, with data gathered from 163 pre-service teachers. It was underpinned by the Technology Acceptance Model (TAM). Partial Least Squares–Structural Equation Modelling (PLS–SEM) was used to test the hypothesised model using SmartPLS version 3.2.8 in the analysis. The model identified six factors that predict pre-service teachers' acceptance of online learning, with a variance of 66.8% in behavioural intention to use online learning. This means that the six factors were good predictors of pre-service teachers' acceptance of online learning to promote social distancing. Pre-service teachers' perceived attitude towards the use of online learning plays a key role in their acceptance of online learning given its explained variance of 54.7%. As a result, in order for online learning to properly promote social distancing, the Department of Higher Education and Training (DHET) should focus more on the factors that improve pre-service teachers' attitude towards using it.

Keywords: social distancing; Coronavirus; Technology Acceptance Model; online learning; pre-service teachers

Introduction

The outbreak of the novel Coronavirus disease (COVID-19), which was declared a global pandemic on 11 March 2020, has completely changed the way people live, socialise, travel and work. Since the 1918 influenza epidemic, COVID-19 is considered the world's worst public health threat (Greenstone and Nigam 2020). As of 21 June 2020, COVID-19 had been confirmed in 8 687 390 people worldwide, with a mortality of approximately 3.7% (Greenstone and Nigam 2020). In the absence of vaccines, most nations implemented social distancing to curb the spread of COVID-19. The purpose of social distancing was to minimise contact and hence reduce the person-to-person spread of the virus. Studies have shown that countries that practised stringent social distancing reduced the spread of the virus as compared to those countries whose policies were slower and more sporadic (Chang et al. 2020). However, social distancing had a terrible effect on the academic agenda in most contact higher education institutions (HEIs) in South Africa and indeed most third-world countries. Social distancing required that there be a distance of at least one and a half metres between individuals, including lecturers and their students. This had a serious negative impact on the available infrastructure in most HEIs that normally cater for large numbers of students (Greenstone and Nigam 2020). At the institution where this study was undertaken, most lecture halls have a capacity of 200 students in one sitting, but COVID-19 and social distancing regulations required this number to be reduced to less than half (Greenstone and Nigam 2020). This forced university authorities to close their institutions and order lecturers and students to conduct their teaching and learning activities online. This meant that lecturer-student contact time was negatively affected (Agbade and Beyin 2021), and online learning was used to kill two birds with one stone: minimising loss of contact time between lecturers and their students, while promoting social distancing necessary to reduce contact. This study aimed to explain factors affecting pre-service teachers' acceptance of online learning to promote social distancing. Social distancing, according to Agbade and Beyin (2021), simply refers to the requirement to keep a distance from others to limit the spread of a virus or the outbreak of a disease.

Background

Online learning is education that takes place over the internet, which makes use of wireless devices, such as iPods, laptops, smartphones, universal serial buses (USBs), cameras, personal digital assistants (PDA), as well as on learning management systems (Alrajawy et al. 2018). These mobile devices are ubiquitous, and they can be used to deliver learning materials regardless of time and place (Alrajawy et al. 2018). Online learning enables teaching and learning to take place without being limited to the four walls of a classroom. Additionally, teaching and learning can take place without learners and teachers being in physical contact with each other, that is, maintaining social distancing. Furthermore, online learning can support social constructivism by allowing learners to collaborate with each other over the internet, thereby encouraging each learner to construct their knowledge and help others to do the same (Taat and Francis 2020). Through the use of online discussions, short message services (SMS),

multimedia message services (MMS), instant communications, on-line chatting, and social media platforms, such as WhatsApp and Facebook, online learning can assist social constructivism (Taat and Francis 2020). Online learning can also support social constructivism through the use of online conference platforms such as Zoom and Skype. This means that pre-service teachers can still apply the traditional learning theories in their bid to promote social distancing. Furthermore, online learning can help learners who are doing science subjects to visualise science experiments (Pinker 1997). Using visualised experiments, teachers can enhance learners' understanding of science concepts, which in turn helps them to remember the concept. A lesson that can be learnt from the studies of Pinker (1997) and Taat and Francis (2020) is that online learning can be used to promote social distancing. Lecturers can achieve this by making use of visualised experiments, making learning materials readily available for their students, and having more contact time with their students remotely.

Online learning can also be implemented to help rural HEIs overcome their infrastructure challenges. In most cases, rural HEIs are underfunded, lack learning and teaching materials, computer and science laboratories, and equipment to enhance successful mathematics and science teaching (Mutambara and Bayaga 2020).

Despite the advantages that online learning provides in the classroom, it has not been widely adopted (Sánchez-Prieto et al. 2019). The acceptance of technology depends on its users' attitude towards using it (Davis, Bagozzi and Warshaw 1989). Padmanathan and Jogulu (2018) note that users' acceptance is critical to the successful implementation and use of online learning. Lecturers and students are the primary users of online learning in HEIs. While the attitudes of students towards using online learning are critical, it is the lecturers who select the instructional method they see fit to teach in their classes (Sánchez-Prieto et al. 2019). They consider and choose the type of technology to be used, its quality and the frequency. MacCallum and Jeffrey (2014) reported that students' use of online learning will remain informal until lecturers support its integration into a more formal way. Osakwe, Nomusa and Jere (2017) concluded that integration of online learning cannot be tapped into if lecturers' attitudes are not considered. Based on the assessments of Osakwe, Nomusa and Jere (2017) and Sánchez-Prieto et al. (2019), it can be concluded that a successful implementation of online learning to support social distancing in HEIs, depends on lecturers' and students' acceptance of the technology.

A plethora of research studies has been carried out to find factors that impact pre-service teachers' acceptance of online learning (Alshmrany and Wilkinson 2017; Nikou and Economides 2018; Sánchez-Prieto et al. 2019; Siyam 2019). Alshmrany and Wilkinson (2017) investigated primary school teachers' acceptance of online learning, Siyam (2019) studied special education teachers' acceptance of online learning, and the adoption of mobile assessment by teachers was the subject of research by Nikou and Economides (2018). However, little is known about the criteria that pre-service teachers deem crucial when deciding whether or not to accept online learning as a tool for

promoting social distancing, despite the fact that earlier research identified factors that teachers consider crucial when accepting online learning (Nikou and Economides 2018; Sánchez-Prieto et al. 2019; Siyam 2019). However, their significance in the explanation of pre-service teachers' acceptance of online learning to promote social distancing continue to remain limited since the studies were not carried out during the pandemic. Furthermore, most of the researchers investigated the acceptance of online learning by teachers from urban institutions (Alshmrany and Wilkinson 2017; Nikou and Economides 2018; Sánchez-Prieto et al. 2019; Siyam 2019). This leaves a gap on the factors that affect pre-service teachers' acceptance of online learning in other places other than urban centres. This promotes social distancing which does not augur well for increasing online learning acceptance and adoption. In order to promote social distancing, this study looked into the factors that influence pre-service teachers' acceptance of online learning. The research focussed on the following question: What are the factors that pre-service teachers consider important when accepting online learning to promote social distancing?

Literature Review and Model Development

Factors Influencing Pre-service Teachers' Acceptance of Online Learning

Online learning can be used by pre-service teachers to encourage autonomous learning, critical thinking, problem-solving, and initiative by allowing them to search for answers on their own. Using online learning provides pre-service teachers with a platform for social interactions which facilitates collaborations and sharing of insightful ideas (Camilleri and Camilleri 2020). Pre-service teachers can use online learning to create a rich real-life context for themselves to stimulate their active learning. This results in them being able to use technology to solve problems. Online learning enables student-centred lessons as opposed to teacher-centred lessons, which in turn deepens and broadens learning experiences (Schulze and Bosman 2018).

However, the pre-service teachers' perceptions of online learning can either limit or improve its usage. The level of online learning integration in HEIs is directly related to pre-service teachers' acceptance of it (Camilleri and Camilleri 2020). Several studies have been conducted to determine the elements that influence pre-service teachers' acceptance and use of online learning (Camilleri and Camilleri 2020; Chiu and Churchill 2016; Levin and Wadmany 2008; Pullen et al. 2015). However, there are inconsistent results about pre-service teachers' acceptance of online learning (Chiu and Churchill 2016). According to previous studies, pre-service teachers in general do not make efficient use of information technology in the classroom (Levin and Wadmany 2008). On the other hand, other studies have found that pre-service teachers are enthusiastic about using online learning (Chiu and Churchill 2016; Pullen et al. 2015). According to studies, perceived usefulness (PU), perceived ease of use (PEOU), perceived attitude towards (AT) use, perceived social influence (SI), and perceived resources (R) all influence pre-service teachers' propensity to adopt online learning (MacCallum and Jeffrey 2014; Pullen et al. 2015).

The Technology Acceptance Model and External Variables

The Technology Acceptance Model (TAM) was the theoretical framework used to analyse the factors affecting pre-service teachers' acceptance of online learning. The TAM was developed by Davis, Bagozzi and Warshaw (1989) in order to forecast users' adoption of new information systems. The TAM is used to represent the mutual relationship between external variables which affect users' acceptance of technology and actual use of the information system. Perceived usefulness and perceived ease of use are the main pillars of the TAM. The amount of work required to learn how to use a new system determines its usefulness. Even if the system is very useful, if people perceive it as being difficult to use, they may tend not use it. The TAM postulates that perceived usefulness and perceived ease of use jointly determine an individual's attitude towards the use of the new information system. The behavioural intention (BI) to use the new system is explained by users' attitude towards using the system and their perception of its usefulness. Behavioural intention predicts actual usage. The degree to which an individual believes that employing a specific information system will boost job performance is described by Davis et al. (1989) as perceived usefulness. The degree to which an individual believes that utilising a certain information system will be effortless is characterised as perceived ease of use (Davis et al. 1989). In the context of technology acceptance, Venkatesh et al. (2003) define perceived attitude towards use as a person's total emotive reaction to the use of new technology. The TAM is shown in Figure 1.
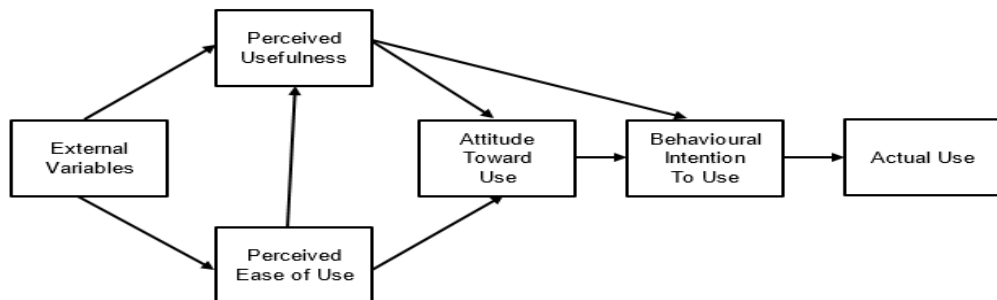
Figure 1: The Technology Acceptance Model (Davis, Bagozzi and Warshaw 1989, 985)

The TAM is the most commonly employed theory in research into the acceptance of online learning (Sánchez-Prieto et al. 2019). It has proven to be resilient over time (Mutambara and Bayaga 2020; Venkatesh et al. 2003). The TAM was chosen for this study partly because it is a well-known and robust technology acceptance theory and it has been used by previous academics to investigate user acceptance of online learning (Sánchez-Prieto et al. 2019; Teo 2008).

TAM Variables

Behavioural Intention

Behavioural intention (BI) to use is the best single factor that predicts actual usage (Davis, Bagozzi and Warshaw 1989; Venkatesh et al. 2003). In the online learning context, Cheng (2019) also report that behavioural intention is a good predictor of actual usage. The current study focused on explaining the factors that affected pre-service teachers' acceptance of online learning where it was not in use, resulting in no actual online learning utilisation. Based on the studies of Cheng (2019), Davis, Bagozzi and Warshaw (1989), and Venkatesh et al. (2003), understanding the factors that influence pre-service teachers' behavioural intention can lead to a better understanding of the factors that they consider significant when accepting the use of online learning.

Perceived Attitude Towards

Pre-service teachers' acceptance of online learning strongly depends on their perceived attitude towards (AT) using it (Mutambara and Bayaga 2020). If pre-service teachers believe that online learning fulfils their needs, they are more likely to accept it. Teo (2008) conducted research to find the effects of teachers' perceived attitude towards using online learning on their desire to do so. The results showed that the participants' attitudes influenced their intentions to use online learning. These findings were congruent with those of Sánchez-Prieto et al. (2019) who report that participants' perceived attitude towards the use of online learning is the key factor of its acceptance and adoption. Teachers are more likely to have a positive attitude towards using online learning if they believe it will improve their performance, which in turn influences their desire to utilise online learning to promote social distancing. Hence, the following hypothesis was formulated:

- H1: Pre-service teachers' perceived attitude towards online learning affects their behavioural intention to use online learning to promote social distancing.

Perceived Usefulness

Perceived usefulness (PU) is defined in the online learning context as the belief that the use of online learning will improve performance (Mutambara and Bayaga 2020). Pre-service teachers' perception that online learning helps them achieve better and that the learning experience through this method influences their attitude towards using it is paramount (Alshmrany and Wilkinson 2017). This assessment was supported by the finding of Aldheleai et al. (2019) who reported that pre-service teachers' perceived usefulness influences both their attitude and behavioural intention to use online learning. If pre-service teachers have a belief that online learning is suitable and expect it to improve their performance, they will have a positive attitude towards using it, thus developing a positive intention to use it to promote social distancing.

Hence, the following hypotheses were formulated:

- H2: Pre-service teachers' perceived usefulness influences their perceived attitude towards the use of online learning to promote social distancing.

- H3: Pre-service teachers' perceived usefulness influences their behavioural intention to use online learning to promote social distancing.

Perceived Ease of Use

The perception that using online learning will be simple is characterised as perceived ease of use (PEOU) (Mutambara and Bayaga 2020). The use of online learning improves pre-service teachers' preparation time for assigned tasks and activities. If online learning platforms are difficult and complicated to use, pre-service teachers may not use the platforms even though they perceive them to be useful. Pullen et al. (2015) discovered that the effort needed to learn to use the online learning influences users' perceptions of its usefulness and their intention to use the platform. On the other hand, MacCallum and Jeffrey (2014) discovered that the effort required to learn to utilise mobile learning had no effect on users' intention to use it.

Pre-service teachers will have a positive attitude towards using online learning and regard it as valuable if they believe it will be easy to use. This will impact their behavioural intention to use online learning to promote social distancing.

Hence, the following hypotheses were formulated:

- H4: Pre-service teachers' perceived ease of use influences their perceived usefulness to use online learning to promote social distancing.

- H5: Pre-service teachers' perceived ease of use influences their perceived attitude towards the use of online learning to promote social distancing.

- H6: Pre-service teachers' perceived ease of use influences their behavioural intention to use online learning to promote social distancing.

External Factors

The TAM provides a conceptual lens that gives the key pillars of user interactions (PEOU and PU), which should be expanded to create a fully-fledged model that can explain and forecast technology acceptance in many circumstances (Lim 2018). Based on this notion, this study added two factors (perceived SI and perceived R) that pre-service teachers are more inclined to consider key when accepting online learning to promote social distancing.

Perceived Social Influence

Pullen et al. (2015) define perceived social influence (SI) in the online learning setting as the extent to which the users believe that influential people feel they should use online learning. In HEIs, social influence includes the influence of lecturers and other students

on students' behavioural intention to use online learning (Alshmrany and Wilkinson 2017). Social influence may come from fellow students, colleagues, lecturers, family and friends. According to Pullen et al. (2015), perceived social influence has an impact on users' perceived usefulness and perceived attitude towards their utilisation. Pre-service teachers will appreciate the value of online learning and have a good attitude towards it if they believe that people who matter to them want them to utilise it to promote social distancing.

Hence, the following hypotheses were formulated:

- H7: Pre-service teachers' perceived social influence influences their perceived attitude towards the use of online learning to promote social distancing.

- H8: Pre-service teachers' perceived social influence influences their perceived usefulness of online learning to promote social distancing.

Perceived Resources

In the online learning perspective, the resources that are needed to facilitate online learning are access to wireless network; computer technical assistance; and availability of computer devices and data bundles. Perceived resources (R) can be described as a person's conviction that the availability of resources can facilitate the use of online learning. Perceived resources have been reported to influence students' perceived ease of use, perceived usefulness and behavioural intention (Ku 2009). The results of Ku (2009) were echoed by Sivo, Ku and Acharya (2018), who found that students' perceived attitude towards online learning is influenced by resource availability. On the contrary, Alshmrany and Wilkinson (2017) found that the availability of resources did not influence users' adoption of information and communication technology (ICT) for classroom use. If pre-service teachers believe that there are sufficient resources for them to use online learning, they will realise its usefulness and they will have a positive attitude towards accepting online learning to promote social distancing.

Hence, the following hypotheses were formulated:

- H9: Pre-service teachers' perceived resources influence their perceived usefulness of online learning to promote social distancing.

- H10: Pre-service teachers' perceived resources influence their perceived ease of use of online learning to promote social distancing.

- H11: Pre-service teachers' perceived resources influence their behavioural intention to use online learning to promote social distancing.

Figure 2 is a hypothetical model for this study which was developed on the basis of the theoretical underpinnings herein discussed.
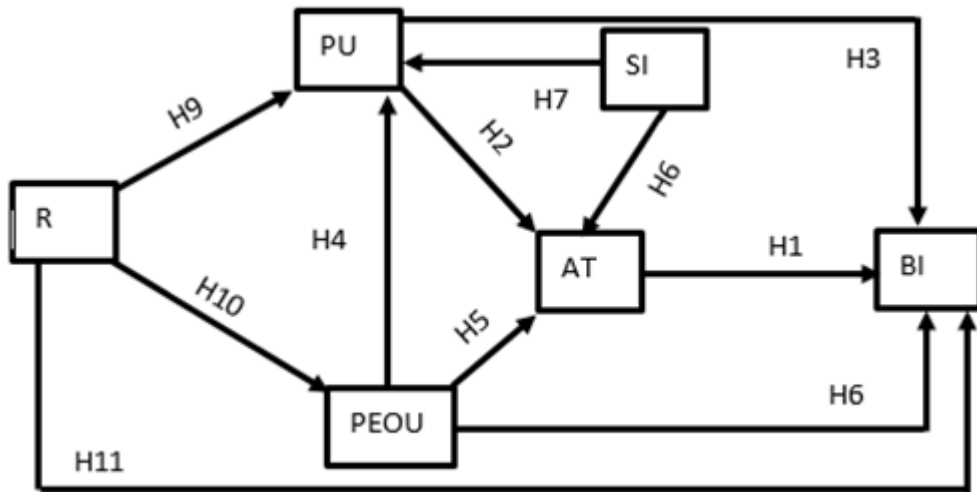
Figure 2: The hypothesised model (designed by authors)

Methodology

Research Design

This study employed a survey design using a 7-point Likert scale questionnaire. According to Creswell and Poth (2016), a survey design, provides a quantitative account of a population's opinions by analysing a sample of the population. A survey was employed in this study to explore the factors that influence pre-service teachers' acceptance of online learning as a tool for promoting social distancing. A survey was chosen because it is inexpensive and can collect a big amount of data in a short period. This is exactly what was required in this study about pre-service teachers' attitude towards online learning in order to promote social distancing. The collected data was analysed using descriptive statistics, and then the hypothesised model was tested using Partial Least Squares–Structural Equation Modelling (PLS–SEM).

Data Gathering Instrument

There were two sections to the questionnaire. The first section asked for the participants' demographic information, while in the second section, the participants completed research scales that measured the model's components. The questions in these sections were adapted from previous studies (Alrajawy et al. 2018; Sivo, Ku and Acharya 2018; Venkatesh et al. 2003) and tweaked to fit the goals of the current study. Alrajawy et al. (2018) provided the items to assess pre-service teachers' behavioural intention, perceived ease of use, and perceived usefulness. Sivo, Ku and Acharya (2018) provide the items for measuring perceived attitude towards and perceived resources. To assess perceived social influence, the study adopted and modified questions from Venkatesh et al. (2003). The instrument was made up of six latent variables totalling 24 indicators.

All of the indicators were graded on a 7-point Likert scale, from 1 indicating "strongly disagree" to 7 indicating "strongly agree".

Participants

The stratified random sampling technique with equal allocation was used to select participants for this study. The equal allocation technique was chosen because the goal was to have all pre-service teachers represented in the survey, irrespective of their proportion in the population of approximately 2 000. Pre-service teachers' levels of study were used as the strata. Level 1 represented the first stratum of pre-service teachers who were in their first year of study, while levels 2, 3 and 4 represented those who were in their second, third and fourth years of study, respectively. The Postgraduate Certificate in Education (PGCE) represented the strata of pre-service teachers. Placing same level pre-service teachers in the same stratum ensured that homogeneous elements were in the same stratum, thereby reducing any estimation errors (Creswell and Poth 2016). There were five strata and 40 pre-service teachers were chosen at random from each stratum. Questionnaires were distributed to all 200 pre-service teachers, and a total of 163 valid questionnaires were collected. This was a very respectable return rate.

Of the 163 pre-service teachers who successfully responded to the survey, 44% were males, while the remaining 56% were females. Regarding their age, 22% of the participants were under the age of 20; 35% were between the ages of 20 and 30; 31% were between the ages of 30 and 40; and 12% were above the age of 40.

When employing PLS–SEM, Hair et al. (2021) suggests that the minimum sample size be 10 times bigger than the number of indicators in the construct with the most items. With six indicators, perceived usefulness was the construct with the most items in the study. The minimum sample size for the current study would be 60, as recommended by Hair et al. (2021). Thus, the sample size of 163 was way above the recommended 60, thereby ensuring that the participants were adequately represented.

Analysis Technique

PLS–SEM was utilised for data analysis using SmartPLS version 3.2.8 software. PLS–SEM is a regression-based method for reducing the residual variances of independent variables (Hair et al. 2021). In order to make inferences it analyses the two types of path models, namely, the measurement model and the structural model. The measurement model defines the relationship between the construct and its items, whereas the structural model establishes the relationships among the constructs, according to Garson (2016). To analyse the data, Hair et al. (2021) recommends a two-step approach. For this study, the measurement model's reliability and validity were examined first. Then the structural model was evaluated for significance of correlations, effect size, explained variance of dependent variables, and predictive capacity of various variables (Garson 2016).

Presentation of Results

The Measurement Model

The measurement model focuses on item reliability, convergent validity, and discriminant validity to define the relationship between the constructs and their associated items (Hair et al. 2021). Reliability refers to the extent to which model items give the same results consistently. The outer loadings in Figure 3 were all above the recommended 0.7 threshold. The composite reliability in Table 1 showed that all values above 0.7. These results indicate favourable measurement model reliability. The degree to which an indicator correlates positively with other indicators of the same latent variable is known as convergent validity (Hair et al. 2021). The average variance extracted valued were used to test convergent validity. Table 1 shows average variance extracted values that are higher than the 0.5 cut-off value (Hair et al. 2021). All of the outer loadings exceeded the 0.7 cut-off threshold (Figure 3). These results confirmed convergent validity for the measurement model.

Table 1: Composite reliability and convergent validity values of the constructs

	AT	BI	PEOU	PU	R	SI
CR	0.883	0.915	0.901	0.931	0.903	0.842
AVE	0.656	0.729	0.695	0.691	0.756	0.640

Notes:

CR = composite reliability

AVE = average variance extracted

The degree to which a construct is actually distinct from other constructs is measured by its discriminant validity (Hair et al. 2021). For this study, the Fornell-Larcker criterion was utilised to measure discriminant validity. The square root of each construct's convergent validity was higher than its maximum association with any other construct, as seen in Table 2 (Hair et al. 2021). The results confirmed the construct's discriminant validity.

Table 2: Fornell-Larcker criterion

	AT	BI	PEOU	PU	R	SI
AT	**0.810**					
BI	0.722	**0.854**				
PEOU	0.567	0.459	**0.834**			
PU	0.589	0.731	0.438	**0.831**		
R	0.481	0.437	0.819	0.406	**0.870**	
SI	0.664	0.614	0.432	0.720	0.370	**0.800**

In conclusion, the measurement model's indicator reliability, internal consistency reliability, convergent validity, and discriminant validity tests were all adequate.
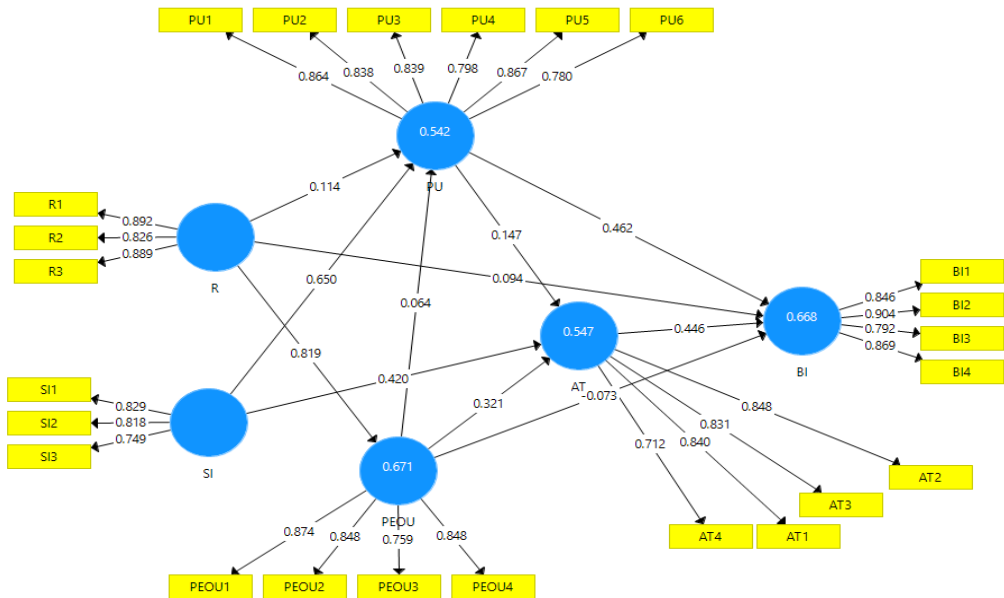
The Structural Model

After establishing the measurement model's adequacy, the structural model was reviewed. The variance inflation factor (VIF) values were used to examine the structural model's multicollinearity. When two or more independent variables are significantly associated, multicollinearity occurs. The VIF values for this study ranged from 1.000 to 3.447, as shown in Table 3. Garson (2016) recommend that if the VIF values are all lower than four, it suggests the absence of multicollinearity. After determining that multicollinearity was not an issue in the structural model, the path coefficients, F-squared, Q-squared and R-squared, were used to evaluate the model.

Hair et al. (2021) suggest that the bootstrapping approach with 5 000 subsamples be employed to test the hypotheses. This approach was adopted in the current study. A standard error derived by bootstrapping was utilised to determine the significance of path coefficients. The empirical *t*-value can be computed using the standard error. The path coefficient is not significant if the empirical *t*-value is less than the critical value (Hair et al. 2021). Due to the exploratory nature of the study, the critical value employed was 1.65 (significant level = 10%) (Hair et al. 2021). The structural model and hypothesis testing findings are summarised in Table 3 and Figure 3.

Table 3: Structural model statistics

Path	Beta	Std error	*t*-value	*p*-value	Decision	VIF	F-squared
AT → BI	0.446	0.082	5.469	0.000	Accepted	1.869	0.321
PEOU → AT	0.321	0.079	4.057	0.000	Accepted	1.281	0.178
PEOU → BI	−0.073	0.104	0.706	0.480	Rejected	3.447	0.050
PEOU → PU	0.064	0.142	0.450	0.653	Rejected	3.225	0.030
PU → AT	0.147	0.075	1.943	0.052	Accepted	2.163	0.020
PU → BI	0.462	0.067	6.875	0.000	Accepted	1.581	0.407
R → BI	0.094	0.108	0.873	0.383	Rejected	3.063	0.009
R → PEOU	0.819	0.037	22.124	0.000	Accepted	1.000	2.037
R → PU	0.114	0.122	0.930	0.353	Rejected	3.040	0.009
SI → AT	0.420	0.093	4.509	0.000	Accepted	2.150	0.181
SI → PU	0.650	0.068	9.619	0.000	Accepted	1.230	0.750

The structural model in Table 3 shows that all the hypotheses of the study were confirmed, except for four, namely: PEOU → BI, PEOU → PU, R → BI, and R → PU because their t-values were less than the critical value of 1.65 and their p-values were greater than 0.05. The effect sizes (F-squared) for the hypotheses are also shown in Table 3. The effect sizes of 0.02, 0.15 and 0.35 suggests a small, medium, and large effect size, respectively (Cohen 2013). Following the suggestion by Cohen (2013), H1, H3, H8 and H10 had large effect sizes. The effect sizes of H5 and H7 were considered medium, while the effect size of H2 was considered small. Six constructs make up the structural model (PU, R, SI, PEOU, AT and BI): R predicts PEOU, BI and AT; PEOU influences PU, BI and AT; PU predicts AT and BI; and SI influences AT and PU.

Figure 3: The structural model (from empirical data)

The explained variance in pre-service teachers' behavioural intention to accept online learning (R-squared) is shown in Figure 3. According to Chin (1998), the R-squared values of 0.19, 0.33 and 0.67 were considered weak, moderate, and substantial, respectively. The model accounted for 54.7% of teachers' perceived attitude towards using online learning; 54.2% of perceived usefulness; 67.7% of perceived ease of use; and 66.8% of behavioural intention to use online learning. To examine the model's predictive power, the blindfold approach was used (Hair et al. 2021). The Q-squared values ranged from 0.325 to 0.438, indicating that the predictive relevance was medium to large (Garson 2016; Hair et al. 2021). All of the Q-squared values were larger than zero, indicating that the model was predictive. Thus, pre-service teachers' acceptance of online learning to promote social distancing can be predicted using the structural model.

Discussion

The purpose of the current study was to explain the factors that affect pre-service teachers' acceptance of online learning to promote social distancing. The results confirmed that the developed model was accurate for explaining pre-service teachers' acceptance of online learning to promote social distancing as it explained 66.8% of the variance in their behavioural intention. According to Chin (1998), this variance is considered moderate. Furthermore, all the Q-squared values were greater than zero, showing that all the hypothesised model's factors (PU, R, SI, PEOU, AT and B) contributed to the variance of pre-service teachers' behavioural intention to utilise

online learning to promote social distancing (Hair et al. 2021). To put it another way, perceived usefulness, perceived resources, perceived social influence, perceived attitude towards use, and perceived ease of use are all strong indicators of pre-service teachers' acceptance of online learning as a tool for promoting social distancing.

Pre-service teachers' perceived ease of use and perceived usefulness influence their perceived attitude towards online learning, which in turn influences their behavioural intention to use online learning to promote social distancing. The results confirmed the findings of Siyam (2019). This implies that pre-service teachers' attitude towards online learning to promote social distancing is influenced by the effort required to use online learning platforms and the ability of online learning platforms to meet their learning needs. It can be argued that user-friendly online learning platforms that can meet pre-service teachers' learning needs encourage them to use online learning to promote social distancing.

Pre-service teachers' intentions to use online learning to promote social distancing are influenced by their perceived attitude towards the use of the technology. The findings were consistent with those of Aldheleai et al. (2019), who found that users' attitudes and beliefs about using online learning influence their intentions to use it. Aldheleai et al. (2019) also came to the same conclusion, emphasising the need for regulating users' attitudes towards using online learning. As a result, for online learning to be successfully deployed to increase social distancing, factors that enhance pre-service teachers' attitudes must be considered, and online learning platforms must suit their teaching and learning needs.

The current study findings corroborated those of Pullen et al. (2015), who discovered that perceived usefulness and perceived attitude towards the use mediated the effects of perceived social influence on behavioural intention to use. The findings suggest that pre-service teachers are susceptible to what students, lecturers, parents, and government authorities have to say regarding the use of online learning to promote social distancing. This means that pre-service teachers' attitudes and beliefs that the utilisation of online learning to promote social distancing meet their learning needs, is influenced by what they hear from people around them (students, lecturers, parents and government officials).

Pre-service teachers' perceived ease of use and perceived usefulness were influenced by the perceived resources that could be made available to them. These findings supported the observations by Ku (2009) that the availability of resources affects the utility and ease of use of online learning. This shows that the availability of resources for online learning is crucial for its successful implementation, as it influences both pillars (PEOU and PU) of the TAM. The results were not surprising considering the fact that pre-service teachers from both rural and urban settings participated in the study.

Implications of the Study

Theoretical Implications

The current study results supported the theory that the TAM can be used to predict and explain online learning adoption. Thus, the study confirmed all of the TAM hypotheses. Furthermore, the results backed up Lim (2018) and Venkatesh et al. (2003), who underlined the necessity of incorporating context-related external variables to increase the TAM's predictive power. The TAM's predictive power was boosted by including the two external variables (SI and R). The study also developed a unique model that could be used by stakeholders to explain pre-service teachers' acceptance of online learning.

Recommendations

The following recommendations might be given to the Department of Higher Education and Training (DHET), teacher training institutions, and online learning platform developers based on the findings of this study and earlier studies that looked at pre-service teachers' acceptance of online learning. When accepting online learning, pre-service teachers examine the effort required to learn how to use online learning platforms. The DHET should partner with universities and teacher training institutions to provide online tasks that equip pre-service teachers with skills to use online learning to promote social distancing; online learning platform developers should create user-friendly platforms; and the DHET should partner with teacher training institutions to provide online workshops to equip pre-service teachers with skills to use online learning to promote social distancing.

Pre-service teachers' behavioural intention to use online learning to promote social distancing is influenced by perceived usefulness. On online learning platforms, developers should incorporate as much learning material as possible. Question papers and accompanying marking procedures, textbooks and visualisation experiments are examples of learning resources that might be uploaded on learning management platforms. The DHET should partner with cellular network providers to supply tablets or laptops and data bundles to pre-service teachers who need to learn using these gadgets before going out to the schools as qualified educators. Pre-service teachers can also be given zero-rated online learning platforms by cellular network providers, since pre-service teachers have shown that they value online learning resources when accepting online learning to promote social distancing.

Contributions of the Study

- Pre-service teachers regard perceived usefulness, perceived ease of use, perceived attitude towards, perceived social influence, and perceived resources, to be crucial factors when accepting online learning to promote social distancing.

- The perceived usefulness and ease of use of online learning are influenced by pre-service teachers' perceived resources. The essential pillars of any technology acceptance model are perceived ease of use and perceived usefulness; hence, the availability of resources plays a critical role in pre-service teachers' acceptance of online learning to promote social distancing.

- Pre-service teachers' perceived social influence affects their perceived usefulness of and attitude towards the use of online learning to support social distancing. Pre-service teachers' views about online learning can be improved by running online learning awareness programmes that are aimed at promoting social distancing.

Limitations and Future Studies

The study participants were all from one HEI rather than several institutions. Therefore, the results found may not be representative of all pre-service teachers' attitudes towards online learning and must be used with caution. Future research could compare and contrast the factors that pre-service teachers think are relevant for continuous use of online learning to promote social distancing in combating the spread of COVID-19. This will enable stakeholders to pursue the academic project with less disruptions. It will be interesting also to have studies that assess the effectiveness of online learning during natural disasters or pandemics.

Conclusion

The purpose of the current study was to explain the factors that affect pre-service teachers' acceptance of online learning to promote social distancing. All of the TAM hypotheses were verified in the study findings, demonstrating that it (TAM) can be utilised to explain pre-service teachers' acceptance of online learning. The findings also showed that including external variables in the TAM improved its explanatory power. Pre-service teachers' behavioural intention to use online learning to promote social distancing explained 66.8% of the variation in the study when perceived social influence and perceived resources were added to the TAM. The findings revealed that perceived social influence and perceived resources had an indirect impact on pre-service teachers' behavioural intention to use online learning to promote social distancing via the mediation of perceived usefulness, perceived ease of use, and perceived attitude towards the use. Pre-service teachers' attitude towards using online learning play a key role in their acceptance thereof. As a result, in order for online learning to properly promote social distancing, the DHET should focus more on factors that improve pre-service teachers' attitude towards it.

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