International Journal of Instruction *July 2024 ● Vol.17, No.3*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 415-434

Article submission code: 20231030164648 Received: 30/10/2023 Revision: 25/02/2024 Accepted: 01/03/2024 OnlineFirst: 03/04/2024

Pre-Service Teachers' Inclination Towards the Utilization of Cloud-Based Technologies

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By harnessing the power of 21st-century, the use of cloud computing resources in higher education has emerged as a hot area for deploying innovative technologies in teaching and learning. Accordingly, the core objective of the present study is to analyze the inclination towards the utilization of cloud-based technologies among pre-service teachers in the present digital environment. Based on studies reviewed, a research model was developed with five usability factors - perceived usefulness, perceived ease of use, perceived security, frequency of usage, and behavior intention. Quantitative survey method was used to collect data among 252 pre-service teachers in Karaikudi locality. Factor Analysis, Percentage Analysis, Pearson Correlation Analysis, Multiple Linear Regression Analysis were employed for data analysis Statistical analysis of the data indicates that pre-service teachers exhibit a favorable inclination towards using cloud-based technologies with a moderate extent, which is predominantly influenced by perceived ease of use. It is evident from the present study that pedagogical approaches need to change for successful integration of technology in future classrooms and for the development of sustainable educational practices.

Keywords: cloud-based technology, cloud computing resources, teacher education, pre-service teachers, utilization

INTRODUCTION

A large-scale upheaval in the field of education is being observed, mainly due to the development in Information Technology (IT). The use of advanced Information and Communication Technologies (ICTs) has revolutionized information access, compilation, analysis, representation, communication, and collaboration (Gousiou & Grammenos, 2023). Classrooms are being equipped with sophisticated gadgets that enable technology-driven learning. The education domain should be able to capitalize on the technological advancements worldwide, such as Cloud Computing (CC), Artificial Intelligence (AI), and the Internet of Things (IoT). "Cloud computing is a

Citation: Ramya, R., & Rajeswari, G. (2024). Pre-service teachers' inclination towards the utilization of cloud-based technologies. *International Journal of Instruction*, *17*(3), 415-434. https://doi.org/10.29333/iji.2024.17323a

kind of computing which is highly scalable and use virtualized resources that can be shared by the users" (Ercan, 2010). In the education sector, CC is a revolutionary step through computing means for achieving greater agility, lower risk, and affordable costs (Nayar & Kumar, 2018). Cloud technology is a great way for the education sector to acquire resources in a systematic and cost-effective way, which are easy to access. CC offers an ideal platform for teaching, learning, and research since it enables multiple stakeholders to access infrastructure simultaneously (Agrawal, 2021). The teaching environment has evolved from a passive mode to the current active cloud-based model (Qasem *et al.*, 2019). CC-based learning will continue to advance across a variety of platforms or applications (Kamaludin *et al.*, 2022). Through web pages, students and administrative personnel can quickly and affordably access different application platforms and resources. As a result of cloud computing, many developing countries have improved their educational system, and Indian universities are developing innovative research with the use of big storage in the cloud technology (Karim & Rampersad, 2017; Thavi *et al.*, 2021). Cloud-based technologies are applications that are remotely hosted on the vendor's server and delivered via the internet. It is a service model that provides computing resources, such as software, analytics, storage, databases, networking, and intelligence, all over the internet. The key benefits of CC may be analysed in terms of cost and scalability for educational institutions, among a wide range of other benefits (Kumar & Sharma, 2017). Teaching faculty will keep track of their students' attendance and upload their lectures, study materials, lesson plans, assignments, and test results over the cloud (Islam *et al.*, 2017; Kale & Mente, 2017; Ahmed & Ahmed, 2018). A simple and efficient multifaceted feedback function between instructors and students is made possible by cloud computing technologies (Xin & Wang, 2020). Educators and administrators will benefit greatly from cloud computing, which offers a wide range of new resources, including cloud based text books, multimedia learning materials, virtual labs, and administrative tools (Singh, & Baheti, 2017). Learning Management Systems (LMS) have led HEIs to use cloud-based technologies (Attaran *et al.*, 2017). Cloud computing services are designed in a way that allows individuals to develop new experiences using their existing ones (Alenezi, 2019). Cloud service model and cloud deployment model are both essential components of cloud computing. Fig 1 depicts the service and deployment models of cloud computing (Srilakshmi *et al.*, 2013; Bokhari *et al.*, 2016).

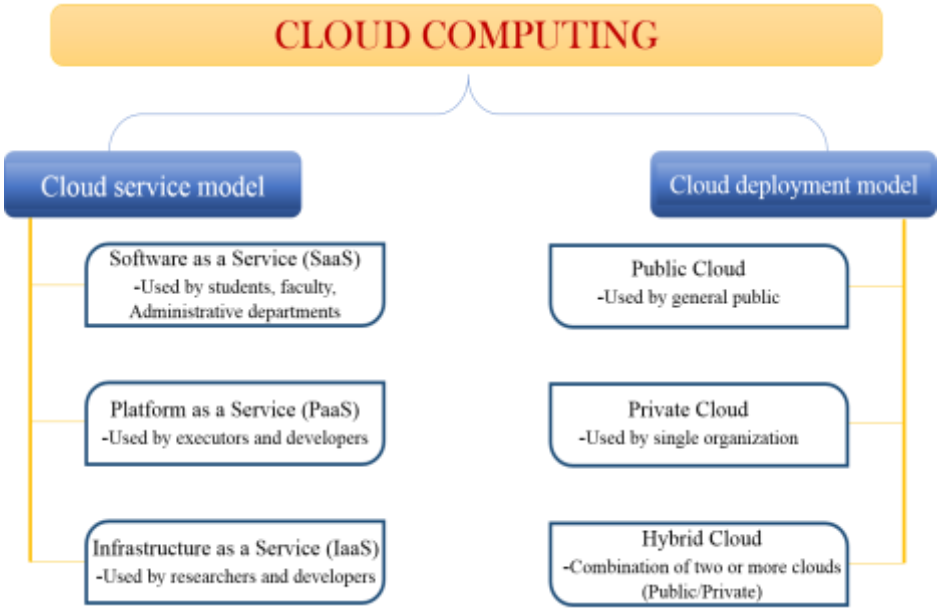

Figure 1
Cloud computing models

Literature Review

This literature review will focus on the studies that address cloud computing technology in teacher education and covers a wide array of variables that can be used to study cloud technologies among pre-service teachers. The quality of teaching and learning in educational institutions has been positively impacted by the usage of cloud technologies in the classroom (Almajalid, 2017).

Using ICT, for teaching and learning in education requires that learning activities be applied or designed as much as possible to take full advantage of cloud technology, and to make use of learning management (Chimmalee & Anupan, 2022). The effectiveness of the learning process is considerably improved by the usage of cloud services (Strutynska *et al.*, 2021). Many academic and non-academic individuals in various regions around the world have excellent knowledge of CC (Alhomdy *et al*., 2021). Due to the fact that cloud computing reduces the overhead of providing local computation, it is beneficial for both teachers and students (Kumar & Bhardwaj, 2020). In e-learning, CC fosters organized collaboration between the instructor and the students (Al-Malah *et al.*, 2021).

In the 21st century, educators have begun to acknowledge the increasing adoption of mobile cloud computing for 21st century digital learners (Matthew *et al.*, 2021). External conditioning as a driving force that persuades teachers to include cloud computing tools into their classroom instruction (Infante-Moro *et al.*, 2020). Almekhlafi

(2016) found participants positively perceive technology-enhanced collaboration in teaching and learning, such as CC, social media, and other digital tools. Study by Han and Trimi, (2022) provides Higher Education Institutions (HEIs) with insight into effective approaches to application of CC-based platforms for remote learning. The academic services and learning infrastructure of HEIs is generally equipped with information technology (Makruf et al., 2022), but university stakeholders are still hesitant to adopt cloud services, future advances in cloud computing could influence their decision (Ali, 2021). Cloud computing has created a professional need for HEIs to evaluate cloud service technology in their pedagogical practices (Wu & Plakhtii, 2021). The study carried out by Velychko et al., (2021) gives pre-service mathematics teachers an opportunity to explore cloud technology during their learning. A positive attitude and intention to use cloud-based technologies has been shown by teacher trainees (Kasiolas, 2017). Pre-service teachers were generally concerned with their personal use of technology (Highfield *et al.*, 2016). It is essential that teachers have the necessary information training for working with cloud technologies, as well as availability of relevant IT skills (Abdurazakov *et al.*, 2017). An analysis by Hermida et al. (2022) found that more than half of 99 pre-service teachers regularly used cloud storage, the only media for which all methods of data protection were used. According to Aburezeq and Dweikat (2020), pre-service English teachers considered cloud applications favourably and integrated them successfully. Cloud computing facilitates planned collaboration, interpersonal interaction, and personalized learning (Çakiroglu& Erdemir, 2019). Chuang (2016) found that social media and mobile technology played multiple roles in supporting informal learning, and that preservice teachers were most confident when including multicultural information in their lessons. The most influential element preventing HEIs from using CC is security concerns (Ali, 2019). The security and privacy concerns of pre-service teachers strongly influence their attitudes toward cloud-based services in educational settings (Arpaci et al., 2015). It is apparent that cloud technology presents advantages as well as challenges, as evidenced by previous studies. Cloud services have become increasingly popular in educational institutions due to their affordability and high accessibility. With the institution's cloud server, teachers can upload course materials, modules, assign tasks, and even conduct online exams. As technology continues to evolve rapidly, educators are striving to incorporate cloud technologies into their teaching methods instead of relying on traditional approaches.

Integrating technology practices into pre-service teacher education should pave the way to a thorough understanding of diverse cloud-based technologies, their functionalities, and boundaries. The study of how pre-service teachers perceive cloud-based technologies is vital to the contemporary educational landscape. With the ongoing digital transformation in education, understanding how pre-service teachers use cloud-based tools is essential. This research has its immediate relevance as a result of the COVID-19 pandemic and the global shift towards remote learning. In light of the rapid pace of technological advancements, it is vital to examine closely the preparedness of pre-service teachers to integrate cloud-based technologies into their future classrooms. The novelty of this study lies in its narrow focus on cloud-based tools which contributes valuable insights to teacher education and professional development by addressing

current concerns and providing an innovative perspective on how these tools can be effectively utilized by pre-service teachers. Therefore, it is crucial to examine the inclination of pre-service teachers to utilize cloud-based technologies. In this study, pre-service teachers' inclination pertains to their perception or attitude towards the use of cloud-based technologies.

Theoretical Framework

CC is an upcoming area in the education sector and cloud-based technologies link teachers and students on a unified platform. The advent of technology has made education more available while also guaranteeing that the material is understandable. It furnishes students access to an abundance of online resources, motivating them to be autonomous, and become more self-reliant. Numerous studies have been conducted in the past that have utilized different theories to understand the acceptance of new technologies. These theories include the Theory of Reasoned Action (1975), Theory of Planned Behaviour (1985), Technology Acceptance Model (TAM) 1 (1986), TAM 2 (2002), TAM 3 (2008), Motivation Model (1992), Unified Theory of Acceptance and Use of Technology (UTAUT) 1 (2003), UTAUT 2 (2012), and UTAUT 3 (2017). Among these theories, the Technology Acceptance Model (TAM) is considered to be one of the most distinguished ones in technology adoption (Shana & Abulibdeh, 2017). Davis et al. developed TAM in 1986 to assess the extent to which digital technologies have been adopted and used among the users. The model provides a suitable theoretical and conceptual framework for understanding human social behaviour and is useful in collecting data about users' perception of a system (Ofori, 2019). Perceived usefulness and perceived ease of use are two key ideas that influence attitudes about usage (Davis, 1986). According to TAM, perceived ease of use has a direct influence on perceived usefulness (Ibili *et al*., 2019). Several external factors influence perceived usefulness, as well as perceived ease of use (Behrend *et al*., 2011). According to Eltayeb & Dawson (2016), the theoretical framework used in their study is TAM, which contends that users tend to avoid personal computing due to security and privacy concerns. User intention is correlated with characteristics related to external security and privacy (Amron & Noh, 2021). In the educational sector, CC is an expanding field, and cloud-based technology creates a platform for connecting teachers and students. To investigate how CC use improves student academic performance, Ali et al. (2018) employ TAM as their theoretical framework. The mediating and moderating effects on TAM 3 factors, such as system characteristics, facilitating conditions, and social impact, were overlooked in research on CC and TAM (Cengiz & Bakırtaş, 2020). Based on studies concerning TAM and its association with CC, the research model depicted in Figure 2 was developed.

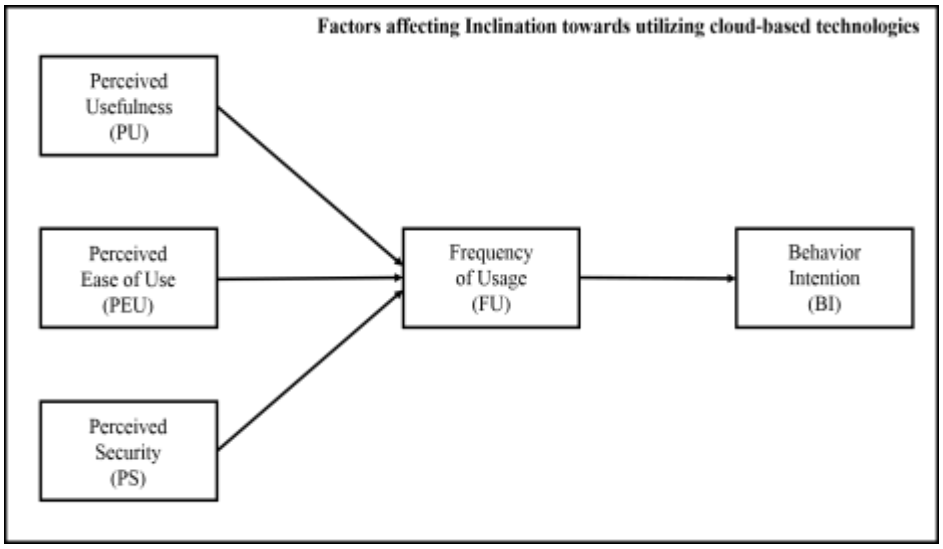

Figure 2
Research model

Various research frameworks have been proposed in literature, but only a limited number of studies have been conducted to investigate the inclination towards using cloud-based technologies. Since pre-service teachers are the potential input in the learning environment, their stance towards cloud-based technology is a pivotal driving force. To upgrade the education industry, it is essential to assess the pre-service teachers' inclination towards the utilization of cloud-based technologies. To address this, the following objectives were established based on the study's aim and research model.

- ❖ To identify the level of pre-service teachers' inclination towards the utilization of cloud-based technologies.
- ❖ To determine the most influential factor in determining the inclination of pre-service teachers to utilize cloud-based technologies.

Research Questions

Q1. What is the level of pre-service teachers' inclination towards the utilization of cloud-based technologies?

Q2. Is there any significant difference among pre-service teachers' inclination towards the utilization of cloud-based technologies with respect to gender and domicile?

Q3. Is there any significant correlation among the factors of pre-service teachers' inclination towards the utilization of cloud-based technologies?

Q4. What is the most influencing factor that determines pre-service teachers' inclination towards the utilization of cloud-based technologies?

METHOD

Research Method

Taking into consideration the nature of the problem being addressed, this research used a quantitative survey approach. Pre-service teachers from the Karaikudi vicinity in the Sivagangai District of Tamil Nadu, India participated in the study using a simple random sampling technique.

Research Instrument

The researcher formulated a self-administered survey questionnaire as a research tool. Using self-administered questionnaires is a good way of shining a spotlight on the perspectives of pre-service teachers and allowing them to reflect on their inclination towards utilizing cloud-based technologies. The statements in the questionnaire used for this study is adapted from previous studies and modified to suit the current research. The survey tool consists of 38 questions with multiple responses. 11 of these questions were answered using a 5-point scale, with options ranging from "Never" to "Always". The remaining 27 questions had a Likert scale format, with five options ranging from "Strongly disagree" to "Strongly agree". Before the collection of concrete data, a pilot study was done to determine plausibility of the research questionnaire. The survey questionnaire was distributed to 40 pre-service teachers from 3 different institutions in the Karaikudi locality. A structured survey questionnaire was shared among the participants via Google Forms URL. “The Google Forms is a cloud-based data management tool used for designing and developing web-based questionnaires” (Vasantha Raju & Harinarayana, 2016). The researcher enabled the ‘required option’ for all questions in the Google form, ensuring complete responses were collected efficiently.

Validity and Reliability

An item analysis was conducted to eliminate uncertain items. Among the 38 items 9 items had a discrimination index of less than 0.2 and needed to be eliminated. The 29 remaining items underwent validity and reliability assessments. Validity and reliability were examined to make certain that each item in the questionnaire was trustworthy with regard to the problem concerned. The study utilized Exploratory Factor Analysis (EFA) to validate the questionnaire and gauge the factor loading. To determine the appropriateness of the data for factor analysis, Kaiser-Meyer-Oklin (KMO) was used. The KMO statistic ranges from 0 to 1, with values greater than 0.5 being acceptable according to Kaiser (1974). Table 1 shows that the KMO statistic in this study was 0.937, indicating that the sampling was adequate and factor analysis was suitable. Additionally, Bartlett's test was used to determine the correlation among variables, and the results showed that there were significant correlations ($p = 0.001$), indicating high significance. This value highlights that factor analysis was applied to a statistically significant set of data.

Table 1
Kaiser-Meyer-Olkin and Bartlett's Test of sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.939
Bartlett's Test of Sphericity	Approx. Chi-Square	3108.64
	Df	235
	Sig.	.000

In EFA, principal compound analysis is used as an extraction method. It will result in the elimination of all inappropriate items in the questionnaire. Following the analysis of data appropriateness, Varimax Rotated Factor Analysis was performed on the questionnaire regarding respondents' inclination towards using cloud-based technologies. This analysis identified five factors, utilizing a fixed number of factor to obtain the solution. The items whose loading values exceed 0.40 are representative of the factor. According to table 2, the factors were computed with the number of items loaded on the factor.

Table 2
Loading of scale items on factors by Rotated Factor Matrix

Factors	Items	Factor Loading	Cronbach's Alpha
PU	Using cloud based education platform improves my digital access to resources.	0.697	0.874
	Using cloud technologies, I am able to collaborate more effectively and save time.	0.661	
	Using cloud technologies enhances my effectiveness on my future job.	0.616	
	Cloud makes it easy to share files with several people at the same time.	0.514	
PEU	Learning to use cloud technology is easy for me.	0.749	0.841
	It is easy for me to become skilful at using cloud technology.	0.673	
	It is easy to access and store data through cloud technologies.	0.640	
	I find it easy to use cloud technologies.	0.631	
PS	I think cloud technologies protect my private information.	0.762	0.823
	I have full confidence in using cloud technologies with security knowledge.	0.755	
	I prefer using cloud to protect my files.	0.639	
	Cloud based educational platforms provide a reasonable level of protection for consumer privacy today.	0.595	
	While using cloud technologies it's better to be careful before trusting it.	0.554	
FU	I use cloud music services like Spotify, YTMusic.	0.788	0.667
	I use cloud platforms such as SWAYAM, National Digital Library (NDL) for my learning purpose.	0.515	
	I use cloud storage applications such as Google drive, Dropbox to store my files.	0.465	
BI	I prefer cloud computing instead of local computing.	0.766	0.801
	I plan to use cloud technologies in my future classroom.	0.641	
	I search the way for using cloud technologies effectively for my learning purpose.	0.502	
	I intend to continue to use cloud technologies in the future.	0.492	
	I prefer to use cloud technologies.	0.438	
	Cloud literacy is a necessity for my future career.	0.437	

The researcher used Cronbach's alpha coefficient (α) to determine the reliability of the questionnaire. "The reliability of scale indicates that the study is free from random error" (Suki et al., 2011). The Cronbach's Alpha values for PU, PEU, PS, FU, and BI were 0.875, 0.841, 0.823, 0.667, and 0.801 respectively, as shown in Table 2. According to Hair et al., (2003), an alpha value above 0.6 deems that the questionnaire is acceptable. Therefore, the questionnaire with 22 items was shared through a Google form link to collect concrete data. The survey responses from 252 pre-service teachers were analyzed to determine their inclination towards using cloud-based technologies. The demographic profile of the respondents is summarized in Table 3.

Table 3
Demographic data of the respondents (N=252)

	Frequency	Percentage
Gender		
Male	62	24.6
Female	190	75.4
Domicile		
Rural	157	62.3
Urban	95	37.7

FINDINGS

Q1. What is the level of pre-service teachers' inclination towards the utilization of cloud-based technologies?

Table 4
Percentage analysis

Factors	Low		Moderate		High	
	N	%	N	%	N	%
PU	90	35.7	97	38.5	65	25.8
PEU	95	37.7	99	39.3	58	23.0
PS	90	35.7	107	42.5	55	21.8
FU	96	38.1	98	38.9	58	23.0
BI	67	26.6	100	47.6	65	25.8

Data from primary sources are analysed with a percentage analysis to obtain quantitative information. From the table 4, it is inferred that, perceived usefulness (38.5), perceived ease of use (39.3), perceived security (42.5), frequency of usage (38.9%) and behaviour intention to use (47.6) cloud-based teachnologies is moderate among the respondents. Based on the above results, the researchers implied that pre-service teachers are inclined to use cloud-based technologies to a moderate extent.

Q2. Is there any significant difference among pre-service teachers' inclination towards the utilization of cloud-based technologies with respect to gender and domicile?

Table 5
Significance test of variables with respect to gender

Factors	Gender				t-value	p-value
	Male		Female			
	Mean	SD	Mean	SD		
PU	3.61	0.876	3.78	0.669	1.438	0.154
PEU	3.52	0.955	3.71	0.773	1.454	0.149
PS	3.32	0.965	3.65	0.701	2.423	0.018
FU	3.00	0.938	3.17	0.939	1.265	0.209
BI	3.55	0.874	3.69	0.690	1.085	0.281

According to the data provided, 24.6% of the sample consisted of male respondents while 75.4% were female respondents. Table 5 displays the results for factors influencing the use of cloud-based technologies, including perceived usefulness, ease of use, frequency of use, and behaviour intention, the calculated p-value for these factors is greater than 0.05. Therefore, the perceived usefulness, perceived ease of use, frequency of usage and behaviour intention do not differ significantly between male and female pre-service teachers.

However, there is a statistically significant difference between male and female pre-service teachers in terms of perceived security, as the calculated p-value is less than 0.05. On average, female pre-service teachers prioritize security and privacy more than male pre-service teachers. There may be a reason for this, such as preventing predators from exploiting them anonymously.

Table 6
Significance test of variables with respect to domicile

Factors	Domicile				t-value	p-value
	Rural		Urban			
	Mean	SD	Mean	SD		
PU	3.77	0.743	3.69	0.702	0.867	0.387
PEU	3.68	0.835	3.63	0.806	0.545	0.587
PS	3.60	0.812	3.52	0.738	0.767	0.444
FU	3.16	0.972	3.07	0.887	0.705	0.482
BI	3.66	0.764	3.65	0.701	0.46	0.964

The sample consists of 62.3% pre-service teachers from rural and 37.7% pre-service teachers from urban domicile. In Table 6, a calculated p-value is greater than 0.05 for factors of inclination towards the utilization of cloud-based technologies. Accordingly, rural and urban pre-service teachers experience no significant differences in the perceived usefulness, perceived ease of use, perceived security, frequency of use, and behaviour intentions in utilizing cloud-based technologies.

Q3. Is there any significant correlation among the factors of pre-service teachers' inclination towards the utilization of cloud-based technologies?

Table 7
Result of correlation analysis

Factors	PU	PEU	PS	FU	BI
PU	1				
PEU	0.763**	1			
PS	0.719**	0.729**	1		
FU	0.411**	0.452**	0.470**	1	
BI	0.798**	0.776**	0.738**	0.462**	1

**. Correlation is significant at the 0.01 level (2-tailed).

A correlation test was conducted to determine the relationship between all the major factors. In the present study, Pearson correlation coefficients (r) were calculated to identify the correlations between the five factors: Perceived Usefulness (PU), Perceived Ease of Use (PEU), Frequency of usage (FU), Perceived Security (PS) and Behaviour Intention to Use (BI). It is evident from the table 7 that there is a high degree of correlation between the factors of inclination towards the utilization of cloud-based technologies and inclination towards the utilization of cloud-based technologies. All five factors are significantly inter-correlated with each other at 0.01 level (Table 7).

Q4. What is the most influencing factor that determines pre-service teachers' inclination towards the utilization of cloud-based technologies?

Table 8
Results of multiple linear regression analysis

Multiple R	.993
R^2	.987
Std. Error	.77854
F	4573.006
Sig. F	.000

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.063	.027		2.346	.020
FU	.211	.006	.297	15.348	.000
PEU	.252	.010	.310	10.500	.000
PU	.281	.011	.306	7.391	.000
PS	.239	.010	.302	12.033	.000
BI	.248	.021	.275	9.363	.000

Dependent Variable: Inclination towards the utilization of cloud-based technologies

The relationship between explanatory and dependent variables were studied using multiple linear regression analysis and the results were summarized in Table 8. The F static was found to be significant at a 1% level (Sig. F < 0.01), thus demonstrating the fitness of the data. Consequently, there is a statistically significant association between the five factors and the inclination towards using cloud-based technologies. The R^2 value of .987 denotes that the factors explain almost 99% of the variance in the inclination towards the utilization of cloud-based technologies. Considering these

coefficients, it can be said that the explanatory variables accurately predict the dependent variable.

The absolute value Beta shows the magnitude of importance of the explanatory variables. The one with the highest Beta value is the most influential factor in predicting the dependent variable. Table 8 revealed that the perceived ease of use had the greatest effect on the pre-service teachers' inclination towards the utilization of cloud-based technologies with a value of β = .310, followed by perceived usefulness (β = .306), perceived security (β = .302), frequency of usage (β = .297) and behaviour intention to use (β = .275). After analysing the Table 8, the following regression equation was formulated:

$$\textit{Inclination towards utilization of cloud technologies } (\hat{y}) = 0.063 + 0.310x_1 + 0.306x_2 + 0.302x_3 + 0.297x_4 + 0.275x_5$$

Where x_1 = perceived ease of use, x_2 = perceived usefulness, x_3 = perceived security, x_4 = frequency of usage, x_5 = behaviour intention to use

The above equation is explained as follows:

1. A constant value 0.063 means that if x1, x2, x3, x4 and x5 have values of 0, then 0.063 is expressed as value of pre-service teachers' inclination towards cloud-based technologies.
2. Regression co-efficient for perceived ease of use is 0.310, means that pre-service teachers' inclination towards cloud-based technologies will increase by 0.310 units when perceived ease of use increases by one unit, assuming other independent variables remain unchanged.
3. Regression co-efficient for perceived usefulness is 0.306, means that pre-service teachers' inclination towards cloud-based technologies will increase by 0.306 units when perceived usefulness increases by one unit, assuming other independent variables remain unchanged.
4. Regression co-efficient for perceived security is 0.302, means that pre-service teachers' inclination towards cloud-based technologies will increase by 0.302 units when perceived security increases by one unit, assuming other independent variables remain unchanged.
5. Regression co-efficient for frequency of usage is 0.297, means that pre-service teachers' inclination towards cloud-based technologies will increase by 0.297 units when frequency of usage increases by one unit, assuming other independent variables remain unchanged.
6. Regression co-efficient for behavior intention to use is 0.275, means that pre-service teachers' inclination towards cloud-based technologies will increase by 0.275 units when behavior intention to use increases by one unit, assuming other independent variables remain unchanged.

DISCUSSION

The present research study aims to analyse the inclination of pre-service teachers towards the utilization of cloud-based education. From the percentage analysis, it is inferred that pre-service teachers have favourable inclination towards utilization of

cloud-based technologies. There was a lower level of perception of meaningful learning using ICT among primary school students (Yasar et al., 2023). In conjunction with pre-service teachers' enthusiasm for integrating cloud-based tools, their positive inclinations are indicative of a growing trend in education where seamless integration of ICT, especially cloud technologies, not only aligns with pedagogical preferences but also fosters collaborative learning for students at all levels. From the differential analysis, it is found that there exists a significance difference between male and female pre-service teachers in their perceived security. Likewise, Sabi et al., (2018) found a statistically significant gap between male and female staffs in terms of their perception of cloud computing adoption. Despite this difference, both genders are actively engaging with and forming opinions about the utilization of cloud-based technologies. From the correlation analysis, it is found that there exists a positive correlation between perceived usefulness, perceived ease of use, perceived security, frequency of usage and behaviour intention to use. The results suggest that these factors collectively contribute to a positive attitude and willingness to adopt cloud technologies. Moreover, perceived usefulness and perceived ease of use have a high correlation (Shana & Abulibdeh, 2017). The result of this study suggests that factor analysis is a viable method for extracting essential factors in explaining the dependent variable. Five factors were most influential factors that impact on pre-service teachers' inclination towards the utilization of cloud-based technologies namely Frequency of usage, perceived ease of use, perceived usefulness, perceived security, and behaviour intention to use. Perceived ease of use was considered to be the most significant factor among the five factors. Similar to the findings, perceived ease of use in CC influenced propensity of prospective teachers and UG students to use it in the future, in line with the findings of Shana & Abulibdeh, (2017). Adoption of cloud computing is directly and significantly correlated with perceived usefulness and ease of use (Raza & Khan, 2022). The use of cloud-based technologies by pre-service teachers has numerous educational benefits, such as improved pedagogical practices, increased accessibility, bridging the digital divide, and cost-effective solutions. Moreover, cloud-based tools can facilitate personalized learning experiences, allowing students to access learning resources and complete assignments at their convenience. The subscription-based pricing models of cloud-based tools can also aid educational institutions in managing their budgets more efficiently. However, the contribution of behaviour intention to use was found to be minimal. Overall, an empirical study found a strong, positive, and significant relationship between all five factors and the likelihood of utilizing cloud-based technologies.

CONCLUSION

In order to achieve global educational sustainability, teaching and learning in the 21st century will require a combination of technological innovation and adaptability to enterprise platforms. A plethora of knowledge is now accessible to both faculty and students from anywhere and at any time using any device because of cloud technology. Teachers play a vital role in digital education and are key in bridging the gap between themselves and their students. The digital transformation of education provides a new and immersive experience for both teachers and students alike. By utilizing cloud-based teaching management platforms, educators can guarantee a more favourable environment to develop and implement teaching activities.

In summary, the research findings perpetually show a positive inclination among pre-service teachers toward the utilization of cloud-based technology. Among the participants, this suggests that there is a general sense of positivity and openness towards the cloud-based technologies. The favorable inclination of pre-service teachers towards the utilization of cloud-based technologies underscores the importance of integrating cloud-based teaching tools and proving training into teacher education programs. The factors influencing this positive inclination encompass perceptions of usefulness, ease of use, security, and the intention to incorporate these technologies into their teaching practices. The research suggests that pre-service teachers are not only inclined to using cloud technologies but also actively engaging with them, demonstrating a readiness to integrate these tools into their future teaching endeavors. It shows that the present study has significant implications for stakeholders in the field of education, particularly for teacher education programs, policymakers, and technology providers. It offers valuable insights for stakeholders to inform strategic decisions, policies, and practices that can promote the effective integration of cloud-based technologies in education, ultimately enhancing the learning experiences of both pre-service teachers and their future students. Recognizing the significance of perceived ease of use, teacher education programs should focus on providing hands-on training and support to enhance pre-service teachers' comfort and confidence in utilizing cloud-based applications as teaching tools.

Further studies may be expanded by examining other variables with a larger sample size. Also, future research could explore on how various teacher education programs incorporate cloud-based technologies into their curriculum and how this affects pre-service teachers' attitudes towards using them. Investigating how cloud-based technologies can be used to enhance teaching and learning outcomes for teachers and students would also be beneficial. Future research should consider exploring these contextual elements to provide a more comprehensive understanding of the complex interplay between pre-service teachers and cloud-based technologies in diverse educational settings.

Despite the potential contributions, it is essential to acknowledge the limitations of the survey research on pre-service teachers' inclination towards the utilization of cloud-based technologies. One limitation is the reliance on self-reported data, which may be subject to social desirability bias. The present study examines the inclination of pre-service teachers utilizing cloud-based technologies, with a focus on five factors drawn from previous researches. There are opportunities for future research to conduct a longitudinal study, which could offer valuable insights into how pre-service teachers' attitudes and usage of cloud-based technologies evolve over time. Sampling bias is a potential concern, as participants may not represent the entire population of pre-service teachers. Efforts should be made to include a diverse sample that encompasses different demographics, academic backgrounds, and geographic locations to enhance the generalizability of the findings.

DECLARATIONS

Data Availability

All empirical data is available upon request to the corresponding author, but the requests will be evaluated individually to ensure their validity and purpose. The provided copies will be anonymized.

Ethics/Originality

The research conducted in Tamil Nadu, India followed the highest ethical standards to ensure data integrity, participant data protection, and confidentiality protocols. The study was based on intensive surveys, and the write-up of the findings mainly focuses on the survey data.

Conflicts of interest

There are no potential conflicts of interest in this study.

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