Overcoming Educational Roadblocks: Empowering Rural College Classrooms withInnovative Teaching Technologies

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Abstract

In today's era of advanced technology, no field can thrive without the integration of technological tools and electronic resources, and the field of education is no exception to this trend. In recent years, a multitude of electronic teaching aids have emerged, making it imperative for educators to stay current to avoid appearing outdated to their students. This research aims to examine the obstacles and difficulties encountered by teachers, particularly those in rural colleges, when employing electronic teaching aids. For this study, the researcherused an online questionnaire as the primary data gathering tool. Totally 320 samples were gathered from colleges in rural areas across three districts in Tamil Nadu, India, specifically Vellore, Ranipet, and Kanjeepuram. Drawing from prior research, the study focused on severalvariables, including internal and external barriers, self-efficacy, peer support and collaboration,and the effective utilization of technology. Based on the previous research a theoretical framework was established, incorporating both mediating and moderating factors. This framework was evaluated utilizing the gathered data by means of a Structural Equation Modeling (SEM) study. The outcomes of the research suggested a negative association betweenobstacles and the employment of technologies such as CAL, MAL, TET, and TEL. Whereas the mediating variable self-efficacy showed positive association on the usage of technologies and the moderating variable peer support and collaboration on self-efficacy showed positive relationship. This research is valuable for improving technology integration in education. It helps educators, institutions, and policymakers enhance teaching and learning by addressing barriers, fostering a supportive culture, and building self-efficacy. The outcome is more engaging and effective education.

Key words: “Improving classroom teaching, Information literacy, Informal learning, Teacherprofessional development, Teaching/learning strategies”.

1. Introduction

The progress and existence of humanity have been significantly influenced by technological breakthroughs, particularly in the realm of artificial intelligence (AI). Educationis just one domain that has been profoundly affected (Alharbi, 2023). Modern-day teachers must contend with not only a more interconnected world but also a wider variety of subject content and assessment methods. Additionally, they need to continuously update their knowledge (Van Weert, 2019). Observing an effective educator at work is intriguing due to theteacher's ability to adapt quickly to new situations (Hepzibah, 2023). Cain's assessment of the current research environment suggests that the existing body of empirical literature pertaining to knowledge transformation is limited in scope. This limitation arises from the difficulty in demonstrating how knowledge is transformed using current empirical investigations (Gnana Sinthiya & Kulothungan, 2021). Teachers' wisdom andunderstanding are invaluable in the classroom, but educational research can lead to innovativenew methods of instruction. However, despite many educators recognizing the value ofimplementing educational research results, only a minority do so (Cain et al., 2016). Using ICT in the classroom has been found to significantly improve teaching standards(Hashemi & Kew, 2020) This has led to a transition from a teacher-centred, lecture-based paradigm of education to one that is more student-driven and collaborative in nature (Sharndama, 2013).The apparent advantages of incorporating cutting-edge technology into the educationalsetting are not without some challenges. It has been suggested that some of these problems arisefrom teachers themselves (Lin & McDonough, 2014)

This study addresses the following queries: As apparent from the studies carried out inthe educational institutions, what kind of relationship do the predefined obstacles have with theuse of CAL, MAL and the rest of the technology-enhanced teaching and learning methods? Regarding the use of technology in education, in case of obstacles, self-efficacy of educators is: As for the hierarchy of the barriers and their impact on the implementation of CAL, MAL, TET, and TEL in education, self-efficacy will facilitate the analysis as a mediator. In the subjectof technology enhancement of practice in teaching and learning environment the extent to which peer support reduces the effectiveness of the implementation of challenges on teachers'self-efficacy.

A comprehensive analysis of the existing body of scholarly works

Recently every educational institution employed innovative technology to encompass a rangeof both established and emerging technologies (Hepzibah et al., 2020). The former category includes commonly used technologies like computers, emails, and mobile phones, while the latter category includes newer technologies such as wikis, podcasts, and other Web 2.0 technologies. Also, the article admits the presence of other technologies that are believed to have the possibilities to improve teaching (Waycott et al., 2010). Technology integration maybe defined in view of the extent to which technology is employed in the instructional and learning practices This is a skill which can also be learned outside the classroom practice (Ertmer, 1999). Teachers' professional work is grounded in their own experiences and understandings. They use this knowledge to develop instructional plans, justify their decision inside the classroom, and adapt their students' perspectives (Hepzibah, 2023). However,educators also rely on several other sources of information while imparting instruction to theirpupils. In contrast that Schoen (1983) introduced in "The Reflective Practitioner" has established a connection between orientation for teaching, such as reflection-on-action, and orientation in teaching, such as knowing-in-action and reflection-in-action. The distinction highlights the reliance of teaching on both theoretical comprehension and the ability to choosethe necessary actions in a specific context (Biesta, 2018). S. H. Lin and Huang (2017) identified another interesting challenge that hinders the integration of ICT in education, that is, inadequate self-efficacy that teachers have in using ICTsfor curriculum development and instructional resources. Researchers have asserted that instructors who lack confidence in their proficiency with information and communication technologies (ICTs) often become preoccupied with their own shortcomings in this area. Consequently, this preoccupation frequently leads to a reluctance to Integrate technology into their instructional methods. This phenomenon can be attributed to a limited understanding of ICT, which acts as a hindrance to its integration within the context of English language teaching.

In addition, the author also presented examination regarding the previous section's predominant complications concerning Information and Communication Technology (ICT) when integrated into the instructional approach of procedural foreign languages in Vietnam, which most of the respondents (70%) expressed that their proficiency and convenience in employing these technologies in educational contexts were at intermediate level (Dang, 2015).According to Molina-García et al. , (2023), financial literacy is a multifaceted concept, which contributes to the development of undergraduate students' risk taking. However, by which aspects of financial literacy is this relation linked to these tendencies depends on the three distinguishing dimensions. In the case of the undergraduate students, financial knowledge andfinancial behavior have a positive impact on risk taking tendency while for the financial attitude, the impact is explains by its effect on financial behavior. The use of technology in theassessment and teaching of the foreign languages has elicited interest from academicians this can be attributed to continuous development in the educational training technology (Zengin &Aksu, 2017). In this research, the term Technology-enhanced language education (TELE) willbe used to mid-communicate the broad spectrum of efforts aimed at effecting an improved integration and utilization of technology in language learning delivery. There are various namesused about CALL such as MALL Mobile assisted language learning TELL Technology enhanced language learning TELT Technology enhanced language teaching These are all aboutcomputer assisted language learning which is the use of technology for gaining a second language (Al-Kadi, 2018). Prior research investigations that have been carried out within the past few decades, a few of which will focus on how students of foreign languages utilize technology in the enhancement of their learning (Almahasees et al., 2021). Technology constraints in rural contexts may constitute a major problem to the delivery and quality of education in rural institutions. Some of the risks that could develop include infrastructure problems, problems concerning computer use, and scarcity of resources problems among others. The article under consideration entitled "Review of Research in Education" consists ofthe analysis and the evaluation of the educational research done in the indicated period (Sinthiya, 2024). Examining the Evidence of Equity in Access, Utilisation, and Outcomes in New Technologies and Digital Environments Many higher education institutions have challenges when attempting to include online learning and provide access to digital materials, mostly owing to the presence of a "digital divide" in rural areas where little or no high-speed internet connection is available (Warschauer & Matuchniak, 2010).

The aim of this research is to evaluate the influence of individual teacher effectivenesson the link between perceived and real obstacles to adopting technology in teaching, while alsoconsidering the potential moderating effect of peer group support and cooperation and the effect of self-efficacy when it mediates. The study determined the variables based on prior literature.

2.1 Dependent variables

Computer-Assisted Learning (CAL): The CAL refers to utilization of computer techniques in the process of education to augment the pedagogical and support learning activities. The significance of media, including computers, within the realm of educational pursuits Althoughthe title may seem paradoxical in relation to the concept of Computer-Assisted Learning (CAL),the essay explores the notion that media person does not have a direct impact on educational results (Sanchez, 2023). Clark (2019), based on his study, opined that the effectiveness of CALdepends on the type or design of instruction material and how they are integrated into classroompractice. Moreover, it has been stated that the failure to use technology cannot guarantee the improvement of education achievements more than merely having it. The integration of technology in instructions is a well thought-out process that involves designing of instructions,employment of instruction's disclosing, a restraint of pedagogical techniques, and assessing these techniques depending on the necessities and goals of learners.

Mobile-assisted learning (MAL): In MALL, there are portable electronics such as smart phones and tablets that creates opportunity for self-learning and teaching activity sets. Unsurprisingly, the proponents of CI noted positive outcomes concerning learners' lexical development and their motivation to learn higher-level language, as evidenced in Klimova

(2018), analysis. However, it also transforms into drawbacks: The complete absence of education, high expenses on technologies, and a small amount of interaction with other

students. According to the study discussed by Klimova, (2019) the weaknesses include the risksof interference from use of more than one mobile phone and the lack of Scelta of English for Specific Purposes (ESP) in different ability levels. MALL is suggested to produce positive effects due to certain psychological factors that involve learners' perception, attitude, and intention towards the process as well as technical considerations (Kamasak et al. , 2020). In order to overcome this problem, systematic theories such as the "Unified Theory of Acceptanceand Use of Technology" (UTAUT) are deployed to incorporate the social, psychological and technical factors in the mobile education as well as in the teaching. These models demonstrate the complex interaction between MALL usage and learning effectiveness, thereby posing difficulties to the original researchers concerning the assessment of MALL (Fortuna et al. , 2023).

Technology-Enhanced Learning (TEL): Applying to TEL, it is possible to point out that TELis the Technical Enhanced Learning meaning that it is the technical way of advancing the learning process. TEL can be defined as the strategies, tools and processes that are applied in the enhancement of quality in education through the use of technology. The paper "Three Generations of Distance Education Pedagogy" by Terry Anderson and Jon Dron holds a deep analysis of the approaches that have been embraced for the facilitation of the distance educationand TEL. In the recent work Tettamanzi et al. (2023), the author has expanded the concept of technological advancement in reforming the remote learning and online learning that has evolved from being an informative to an enriched student oriented process. The general area ofconcern of the article is once again the distance education; however, the facts are rather helpfulif one is to comprehend the fact of TEL as it emphasizes the need for a pedagogy while delivering technology in a classroom environment. This particular material can indeed be considered as the very framework that would help to understand how technology has enrichedthe sphere of education by describing the distance education three generations and their historical development.

Technology-enhanced teaching (TET): Thus, TET can be described as refers to use of technology in enhancing the process of education. While there is a shift of focus to the survey and interview results which depict the practices of learners and educators, it emerged that Ohio's educators use simple tools such as PowerPoint in sharing knowledge while using projectors in facilitating presentation (Wahyudi Rahman et al., 2020). Microsoft Word is usedfor instructional materials and feedback on student writing. Emerging technologies like Moodleare mainly used for content organization and student engagement through forums. Moodle alsoaids in homework management, student meetings, assignment evaluation, and in-class quizzes.

WeChat is utilized for communication and information sharing with students. Additionally, educators guide students in using handheld devices for oral English, audiovisual resources, andthe learning platform Kahoot! for questions, quizzes, and course review (Liang, 2021).

2.2 Independent variable

The independent variable centers on an individual's encounter with barriers when implementing e-teaching aids in rural college classrooms.

Lack of training and professional development: Harris & Jones (2010), states Insufficient training and limited opportunities for professional development Educators may encounter challenges in the proficient use of instructional materials owing to a dearth of training and opportunities for professional growth.

Limited Access to Resources: The accessibility of instructional resources and educational technology may be constrained, especially at educational institutions and areas characterised by limited financial means (Ertmer & Leftwich 2013).

Resistance to Change: It refers to the tendency of individuals or groups to exhibit opposition or reluctance towards Educators may exhibit resistance towards the use of instructional aids asa result of apprehension towards change, preference for conventional methodologies, or anxieties pertaining to their own technical proficiency (Advance Praise for The New Meaningof Educational Change, 2014).

Digital Literacy Gaps: The phenomenon of digital literacy gaps refers to the disparities in individuals' abilities to effectively navigate and use digital technologies and resources (Hargittai 2010)

Time Constraints: The limitations imposed by time Educators often have constraints on theirinstructional time to successfully integrate teaching aids into the curriculum (Santos-Jaén

et al.,(2022).

Technical Issues: Ballesteros-Sola & Magomedova, (2023) revealed that the presence of technical difficulties, such as equipment or software malfunctions, might impede the effective use of instructional aids within the classroom setting. Utilizing technology to enhance pupils' problem-solving abilities. (Davies & West, n.d.)

Institutional Policies and Support: Teachers may be discouraged from using instructional aids due to a lack of support and the presence of restrictive rules inside educational institutions(Walmsley & Wraae, 2022).

Student Readiness and Engagement: The lack of familiarity or active involvement of students with technology or instructional tools might provide a hindrance to their proficient use(Mouza et al., 2017 and Thind & Yakavenka, 2023).

Financial Constraints: A notable obstacle that might impede the acquisition and maintenanceof instructional aids is the lack of enough funds (Becker, 2017). The article titled "Balancing technology and tradition: The teacher's role," explores the role of teachers in maintaining a balance between technical amalgamation and methods of historical teaching (Bell & Cui, 2023).

Cultural and Societal Factors: People's actions, attitudes, and beliefs are greatly shaped by the culture and society in which they are immersed. it includes various elements that do not include language, customs, socio-cultural norms, and influences that might have an impact onopinions and use of teaching aids by instructor (Ratten & Jones, 2023).

Pedagogical Alignment: The term of pedagogical alignment refers to the process of ensuringthat instructional strategies, learning objectives, and assessments are closely aligned with eachother. This alignment is very vital in the task of leveraging that teaching aids are in line with instructional objectives while pedagogical techniques may be a cause of a major challenge. Schulz et al., (2020). The first step undertaken by the researcher was to justify the existence of a direct relationship between the independent variable and the dependent variable.

H1: The challenges of e-teaching aid development significantly affect CAL utilization level inacademe.

H2: The adoption of Mobile-Assisted Learning (MAL) is greatly influenced by the challengesthat are associated with the use of e-teaching aids.

H3: The Mobile Technology-Enhanced Teaching (TET) is influenced by the constraint linkedwith e-teaching aids.

H4: The level of using Mobile Technology-Enhanced Learning (TEL) is significantly affectedby the challenges that are associated with e-teaching aids.

2.3 Mediating and moderating variable

Teachers' Self-efficacy: As for the notion of 'Techno-Pedagogy', 'Teacher Self-Efficacy' is anintermediary variable when technology tools are used by educators for teaching and learning. The level of competence that teachers when implementing, different strategies and tools in class is referred to as self-efficacy. With regards to the remaining hypothesis, Tschannen-Moran et al. (2005) established that the beliefs that educators have regarding the usefulness of educational e-teaching aids can be key determinate when it comes to the extent to which theyare willing to deal with the existing implementation challenges.

H5: The mediating variable teacher's self-efficacy, and the barriers of using e-teaching aidsdoes affect it to a considerable extent.

H6: The Barriers are directly linked to Self-efficacy which in turn influences the utilization ofCAL.

H7: Self-efficacy partially regulates the connection between barriers and the occurrence of Mobile Assisted Learning (MAL).

H8: Self efficacy will moderate the connection between barriers and the kind uses of Mobile Technology Enhanced Teaching and Training (TET).

H9: The link between barriers and MTEL depends on Self-efficacy of the learner.

Peers Support and Collaboration: Support and cooperation with peers can act as a moderator with regard to supplementary support materials in the case of teachers. When looking at the components that make up an optimal utilization of instructional resources, the level of endorsement and collaboration that faculty receives is an important focus which encompass peer teachers, school administrators and other stakeholders in the educational fraternity (Louis 2007).

H10: There is a positive impact on self-efficacy when peer support and collaboration moderate.

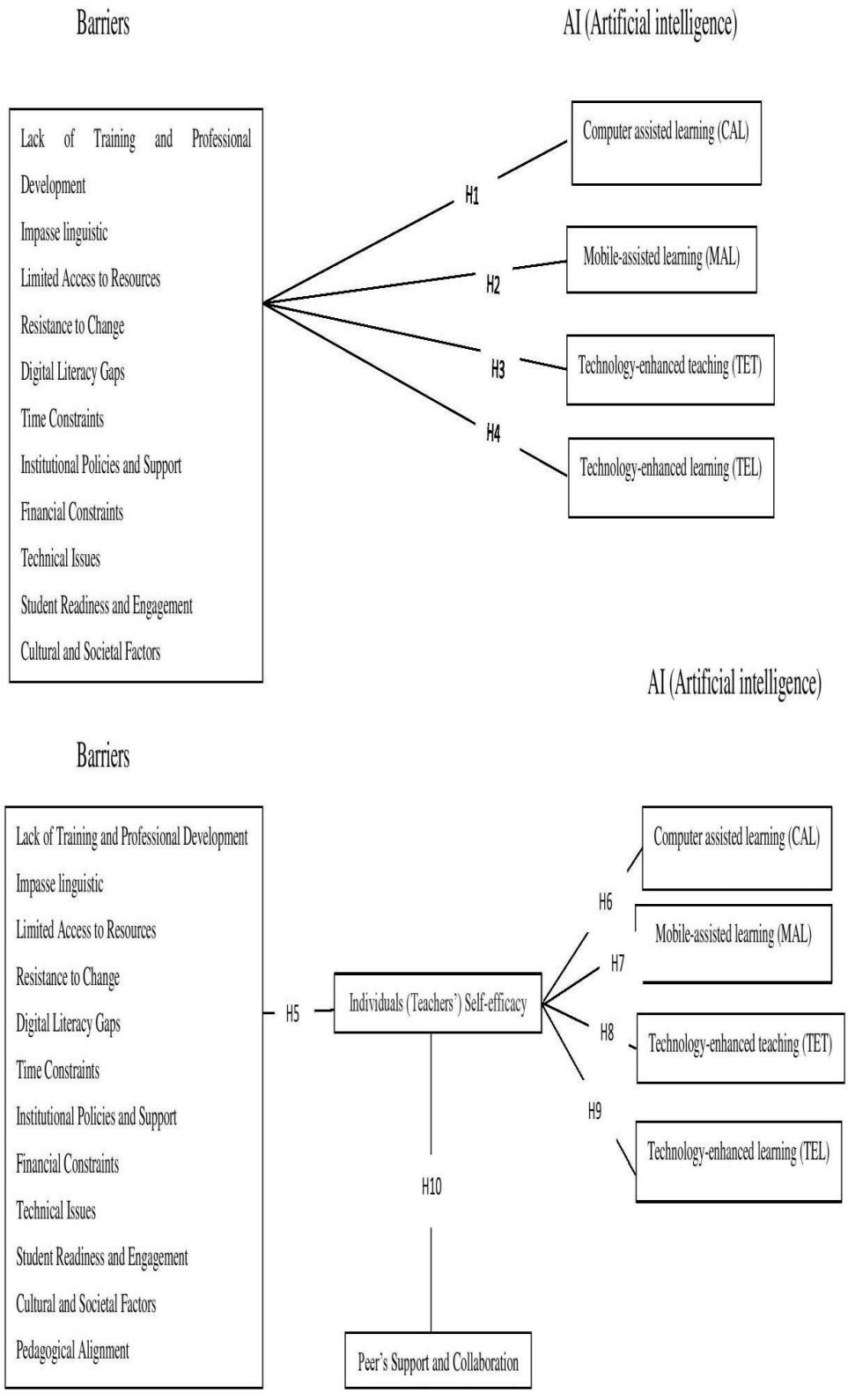


FIG 1 THEORETICAL FRAMEWORK

3. Methodology

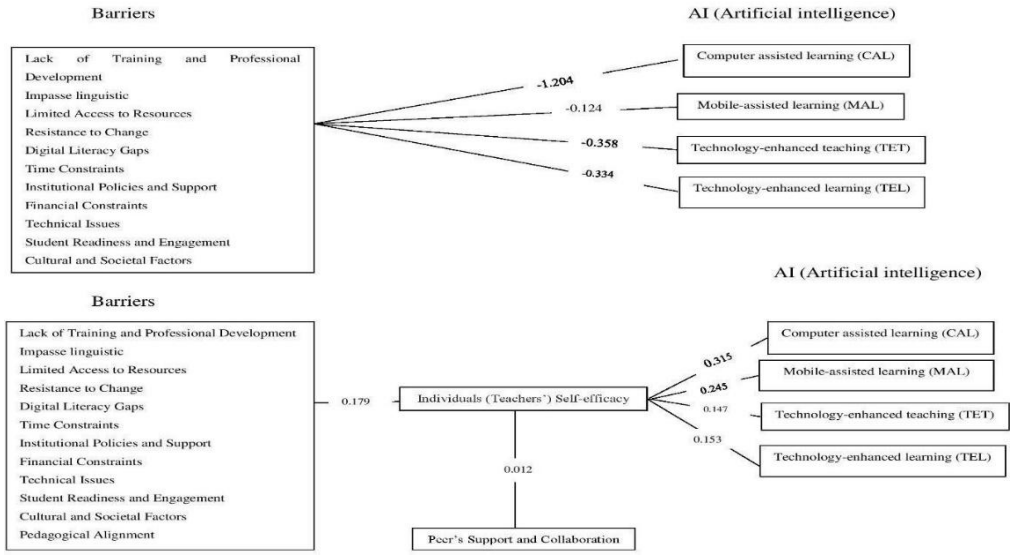
To better comprehend how teachers are using e-learning tools, we gathered quantitative data via an online. their viewpoints on this topic, and the problems they face when incorporating technology into their teaching practices. The survey instrument had four distinct components. In the first section, participants were instructed to provide details pertaining to their gender, age, educational attainment, and professional experience duration in their respective domains. Section B was asking the participants how often different technology tools are implemented inthe classroom. Replies were recorded using the Likert scale that had values as follows: 1= None, 2= Rarely, 3= Occasionally, 4= Often and 5= Very often, nearly every day. In Section C,participants were tasked with evaluating statements pertaining to the challenges encountered during the implementation of technology solutions in the educational context. The results of this evaluation were collected through a Likert scale with responses on a one-point scale fromone to five; where one represented the opinion of strong disagreement while five represented the opinion of strong agreement. The teachers completed a Likert scale questionnaire attachedto the participants; items included self-reported competence and peer assessments. The Likert scale adopted the use of a 5 – point scale with 1 being the strongly disagreed option and 5 representing the strongly agreed option. The questionnaire necessitates the following sequence: The questionnaires were initially subjected to a pilot test wherein 50 stamped copies were administered. This is an important pilot study to discover the factors which can be investigatedto a limited extent. The purpose of this pilot study is to assess the factors under investigation. After collecting data from the pilot test, certain adjustments were made to the variables. The researcher sent the link of questionnaire through the respective college mail ids to collect datafrom college instructors in the rural areas of Vellore, Ranipet, and Kanjeepuram, where a widerange of academic disciplines were represented. Out of the total of 327 samples collected, nearly 7% were incomplete upon submission to the researcher. Ultimately, 320 samples were deemed suitable for analysis. PLS-SEM was utilized to thoroughly investigate the mediating and moderating effects of various factors in the context of independent and dependent variables.

Categories	Frequency	Percentage
Gender		
Male	205	64
Female	115	36
Below 25	41	12.8
26 to 35	79	24.6
36 to 45	97	30
46 or above	103	32.18
Degree		
Bachelor	1	0.31
Master	89	27.81
PhD	230	71.87
Years of teaching experience	29	9
1–5	43	13.4
6–10	78	24.3
11–15	170	53.12
16 or more		

Attending training programs (using e-learning aids)			
		149	46.5
	Yes	171	53.4
	No		

Table 1- Ethnic characteristics of the survey participants (N=320)

The information presented in the table 1 depicts the demographic traits of the individuals who took part in the survey. Of the survey participants, 64% were male, while 36%were female. Moreover, 32% of the respondents were above the age of 46, and 30% belonged to the age bracket of 35 to 45. Additionally, 71.8% of the respondents held doctorate degrees,and 53% possessed over 16 years of professional experience. Notably, only 53% of the participants had undergone technological integration training programs, while the remainder had not participated in such programs.



(source-PLS-SEM)

3.1 Results and interpretationPath coefficients

Table 2

Barriers -> CAL	-1.204
Barriers -> MAL	-0.124
Barriers -> TET	-0.358
Barriers -> TEL	-0.334
Barriers -> Self-efficacy	0.179
Self-efficacy-> CAL	0.315
Self-efficacy -> MAL	0.245
Self-efficacy -> TET	0.147
Self-efficacy -> TEL	0.153

Peer support -> Self-efficacy	0.012

(source-PLS-SEM)

The regression coefficients (represented by arrows connecting latent variables) among all variables, there is a negative correlation between the independent and dependent ones (table2). Therefore, a mediating variable (Self-efficacy) is established between the independent variable and dependent variable, which shows a positive relationship among all the variables. Additionally, a moderating variable (peer support and collaboration) is also examined to measure the effect of self-efficacy, and it also displays a positive relationship among the variables. According to the above chain of reasoning, the obstacles are strongly related to technology adoption through moderating and mediating factors (Hair et al., 2014).

3.2 Composite reliability, Cronbach's alpha, Average variance extracted (AVE)

Table 3

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
CAL	0.884	0.953	0.506
MAL	0.873	0.885	0.543
TET	0.795	0.783	0.462
TEL	0.823	0.923	0.598
Barriers	0.846	0.701	0.639
Self-efficacy	0.905	0.845	0.677
Peer support and collaboration	0.783	0.823	0.523

(source-PLS-SEM)

Composite dependability is a statistical measure that may range from 0 to 1, where a value of 1 signifies perfect precision. it is necessary to establish the suitability of the model for exploratory purposes. it is recommended that composite reliabilities have a minimum value of 0.60 (Hair et al., 2014). For models intended for confirmatory purposes, a higher threshold of at least 0.70 is suggested (Henseler et al., 2015). Furthermore, in the context of confirmatory research, it is advisable to have composite reliabilities of at least 0.80 (TomassMHultt, n.d.). Ifthe composite reliability is over 0.90, it is possible that many indicators may just differ slightly in language rather than really representing distinct judgement of the underlying notion. The researcher should consider if the indicators adequately reflect the intended dimension and exhibit strong relationship, or whether the very high composite reliability is indicative of a design flaw. Given that the model's total dependability exceeds 0.90 according to table 3, it adheres to the commonly accepted guideline.

Cronbach's alpha is a metric used in statistics that assesses the degree to which the indicators of latent variables demonstrate convergent validity and, therefore, reliability. A highquality scale is defined as having a minimum value of 0.80, a good scale as having a valueof 0.70, and a scale under experimental settings as having a value of 0.60. The Cronbach's alphacoefficients are above the threshold of 0.80, suggesting a high level of reliability for both the questions and scales used in the study (Hair et al., 2014).

The AVE (Average Variance Extracted) method can be utilized to estimate convergent or discriminant validity. Average degree of social cohesion (AVE) means to what extent social beings are related. The relationship between the individuals in latent variables of the reflectivemodel. The variables to be included in a suitable model should be able to predict at least 50 percent of the fluctuations observed in the related variables. Additionally, the average variance extracted (AVE) should be more than a value of 0.5, as suggested by Henseler et al.,(2015).When the error variance exceeds the explained variance, it is indicative of a score of 50.According to the values in table 3, all the variables exhibit a high degree of proximity to the target value.

3.3 Heterotrait-Monotrait Ratio of Correlations (HTMT)

Table 4

	Barrier	CAL	MAL	TET	TEL	selfefficacy	peer support
Barrier	1.000						
CAL	0.75	1.000					
MAL	0.62	0.80	1.000				
TET	0.70	0.79	0.78	1.000			
TEL	0.79	0.74	0.75	0.76	1.000		
self-efficacy	0.78	0.78	0.81	0.71	0.69	1.000	
Peer support	0.79	0.73	0.80	0.71	0.72	0.79	1.000

(source-PLS-SEM)

The HTMT ratio, which signifies the extent of connection between two attributes, is deemed acceptable when it falls below 1, signifying that the model accurately aligns with the observed data. According to Henseler et al., (2015), there is evidence of discriminant reliabilitywithin two reflective notions when the HTMT value is less than 0.90. The values displayed inthe table 4, mentioned earlier adhere to the standard guidelines.

3.4 Multicollinearity

Table 5

	Barrier	CAL	MAL	TET	TEL	selfefficacy	peer support
Barrier	1.000	0.75	0.62	0.70	0.79	0.78	0.79
CAL	0.75	1.000	0.80	0.79	0.74	0.78	0.73
MAL	0.62	0.80	1.000	0.78	0.75	0.81	0.80
TET	0.70	0.79	0.78	1.000	0.76	0.71	0.71
TEL	0.79	0.74	0.75	0.76	1.000	0.69	0.72
self-efficacy	0.78	0.78	0.81	0.71	0.69	1.000	0.79
Peer support	0.79	0.73	0.80	0.71	0.72	0.79	1.000

(source-PLS-SEM)

Structural multicollinearity is a problem in both reflective and formative models for the samereasons that it is a problem in ordinary least squares (OLS) regression models. In a welldesignedmodel, it is expected that the coefficients of the structural variance inflation factor (VIF) shouldnot exceed a predetermined threshold of 4.0. The figure shown in the

aforementioned table 5 adheres to the commonly accepted heuristic(Hair et al., 2014).

3.5 Model Fit

Table 6

	Saturated model
SRMR	0.072
d_ULS	7.765
d_G	92.078
Chi-square	3741.015
NFI	0.271

(source-PLS-SEM)

Researchers employ the SRMR statistic to assess how closely the model aligns with theactual data. This method functions to measure the degree of inconsistency between the observedcorrelation matrix and the correlation matrix forecasted by the model. To clarify, a smaller Standardized Root Mean Square Residual (SRMR) signifies a more favourable correspondencesince it reflects the average magnitude of these discrepancies. The concept of good model fit isoften operationalized as an SRMR value that falls below the threshold of 0.08, as proposed byHu & Bentler (1998). The framed model demonstrates a decent fit (table 6), as shown by its SRMR value of 0.08.

3.6 Structural Model Assessment

Table 7

Hypotheses		B	mean (M)	STDEV	T stat	P values	Decision
H1	Barriers-> CAL	-0.604	2.65	0.223	-6.497	0.511	Rejected
H2	Barriers-> MAL	-0.758	3.106	0.213	-7.439	0.201	Rejected
H3	Barriers-> TET	-0.824	4.209	0.059	-8.471	0.457	Rejected
H4	Barriers-> TEL	-0.859	2.357	0.083	-7932	0.534	Rejected
H5	Barriers-> self-efficacy	0.395	3.334	0.077	4.121	0.000	Accepted
H6	Self-efficacy -> CAL	0.245	2.259	0.106	2.284	0.011	Accepted
H7	Self-efficacy -> MAL	0.157	2.75	0.212	3.489	0.001	Accepted
H8	Self-efficacy -> TET	0.423	4.34	0.123	4.354	0.000	Accepted
H9	Self-efficacy -> TEL	0.153	3.54	0.321	2.845	0.000	Accepted
H10	Peer-support-> self efficacy	0.25	2.12	0.142	4.569	0.000	Accepted

(source-PLS-SEM)

The table 7 shown above displays, the results of bootstrapping analysis conducted on 5000 sub-samples, along with the corresponding hypothesis decisions. The hypotheses H1 (β =-0.604; p>0.001), H2 (β =-0.758; p>0.001), H3(β =-0.824; p>0.001), and H4 (β =-0.859; p>0.001) have been rejected, where H5 (β =0.395; p<0.001), H6(β =0.245; p<0.001), H7 (β=0.157; p<0.001), H8(β =0.423; p<0.001), H9(β =0.153; p<0.001), H10 (β

=0.25; p<0.001) has been accepted. Therefore, the presence of mediating variable self-efficacy and moderating factors contributes to a favourable impact on the barriers to the use of technology. The influenceof peer support and collaboration shows positive impact on the mediating variable self-efficacy(Hair et al., 2014).

4. Discussion

This study was designed to examine a hypothesis concerning students' beliefs about their ability to effectively integrate technology tools into their teaching practice, students' self-efficacy in implementing the technologies, the kind of educational technologies they use, and the role of peers in supporting and encouraging them. Hypotheses H1 to H4 postulated a positive relationship between barriers and the utilization of specific educational technologies (CAL, MAL, TET, and TEL). However, these hypotheses were rejected, indicating that the presence of barriers does not directly lead to increased utilization of these technologies. This suggests that the relationship between barriers and technology adoption is more complex than a simple positive relation. Barriers, such as limited resources or inadequate training, may detereducators from using technology despite its potential benefits. Therefore, these educators are likely to persist in avoiding ICT integration in their classrooms. As a result, 21st-century teachers may not be making the most of their opportunities if they aren't making use of ICT inthe classroom. The basic hinderance to the effective implementation of ICT may be seen as a deficiency of trust. It is an undeniable reality that individuals lacking confidence in using e- teaching aids would inevitably impede the overall adoption and integration of ICTs (Liu et al.,2023). The findings from this study align with earlier research conducted by Al-Senaidi et al.,(2009), Nikolopoulou & Gialamas (2015) and Yuen et al., (2003). These previous studies similarly recognized that instructors commonly face a lack of confidence when it comes to utilizing e-teaching aids. On the other hand, accepting H5–H9's posited positive link betweenobstacles and technology use with self-efficacy as a mediator. This finding can be used to betterillustrate that self efficacy is a critical mediating variable in minimising the influence of the technology adoption barriers. Barriers can be obstacles that hinder educators' ability to use technology, while self efficacy is the confidence that teachers have in their ability to work through barriers and get the job done – the former having a negative impact on the latter and the end result being technology use. This highlights the need to enhance educators' self-efficacyby training and supporting them to succeed in implementing innovations. Consequently, the findings accumulated within the framework of these hypotheses are informative in terms of the processes occurring in technology-enhanced educational systems. Kormos & Nijakowska, (2017) in their study based on a questionnaire also focused on the concerns and self efficacy beliefs of language teachers regarding MOOCs and the courses and they compared the pre- course and post-course data collected from the teachers who taught MOOCs. In his work, the author can confidently state the primary sample population mostly had considerably positive perceptions. Bu et al., (2023) stress the urgency to focus on the College Students' reasoning abilities, fostering their social and human capital and trying to create an entrepreneurial culturethat accepts failure and fosters innovation. Hypothesis 10, suggesting a positive impact on self- efficacy when peer support and collaboration moderate, was accepted. This indicates that peersupport and collaborative efforts among educators have a positive influence on self-efficacy. When educators collaborate and support one another in technology integration efforts, they canbuild confidence and competence, which, in turn, enhance self-efficacy. This positive cycle ofsupport and selfefficacy contributes to greater technology adoption. In the absence of appropriate training, and the peer support educators may encounter challenges stemming from their limited understanding of implementation technology within a constructivist framework. (Taghizadeh & Hasani Yourdshahi, 2020).

5. Conclusion

In a nutshell, this research provides a sophisticated comprehension of the variables affecting the widespread use of technology in classrooms. Self-efficacy appears as a significant mediating component, even when removing obstacles alone does not ensure greater use of instructional tools. Teachers mostly overcome resistance by incorporating technology into theirlessons when they feel confident in their own abilities to do so. The fact that peer support in anaugmenting environment of self efficacy for learning technologies capacity demands

buildingof educators by making readily available to the educators an environment within which they can inter-change, sharing ideas, incorporating peer support from each other in the provision of a meaningful solution to the complex issues emerging from learning technologies integration.

6. Theoretical and practical implications

According to the study, one of the suggestions given is that educational institutions should alsooffer definite practice to the said practitioners. Such programs should, once developed, be designed to conform to some of the barriers existing in the institution. To address the needs ofthe learners, institutions should carry out training that should meet their needs in their region and not train educators like all the other institutions. It may be relevant to obtain an idea of thestate of training received by the institutions and the difficulties the educators encounter by administering a brief questionnaire before commencing the trials. In this way, this evaluation could be useful in constructing a more effective approach to the creation of the training modules that would all work to alleviate these particular issues. Professional development should not bemade in a one way acting mode rather be formed in a regular and cyclic manner. As for the staff's continuing professional development, education institutions have a responsibility of making sure that one is provided with opportunities for continuing his/her education in order that he/she may be up-to-date on various ideas in education theory and practice. These schoolsand colleges should develop learning peer groups or interaction nets through which the teacherscan share their practice and ideas. These communities are useful as they establish the forum from which one can learn from the others, find out where others integrated and possibly learn from them how they were able to overcome some of these barriers to technology adoption. Thefollowing organizational actions are quite effective: N may have new teachers who may be reluctant to change as source new teachers for advice on how to incorporate the technological in their classrooms. Some of the ways that mentors can help is that they can provide information, advice, and social support, and develop the self-assuredness of the less experienced teachers. Technological integration should therefore be supported through the creation of cultures of technology in institutions of education. This entails assigning ofresources for training, procurement of necessary tools and technologies, plus giving incentivesto enthusiasitic educators in the use of technology. Principals and college presidents have to provide leadership when it comes to the use of technology in schools. Teachers' motivational factors that relate to their ability to overcome barriers can be enhanced through administrativesupport. The self-efficacy beliefs should thus be made a core of the professional development programs in the institutions. This can comprise of tutoring on how one can be confident whenusing the technology and ways of handling problems. One way to motivate the educators to embrace what is required of them is to have an understanding that they too have deficits that they need to work on as identified by the trainers themselves. These may be useful in overcoming personally attributed barriers as well as enhancing self-confidence or self-efficacy.Is the belief of educational institutions to make it possible for the teachers to be grouped together so that they may meet formally or informally. These can fall under structured interprofessional project work, cross-faculty and cross-specialization, observation of oneanother in the use of technology in teaching. One of the most potent approaches is setting up peer learning circles, thus creating small groups of educators who meet from time to time to share tales of the trade, success stories, and seek for solutions to similar problems. Schools andcolleges should have procedures through which they can get feedback regarding the satisfaction of trainers concerning the efficiency of training programmes, availability of training aids and the support they get. Such feedback in turn can assist institutions in having means of enhancing their support systems on a progressive basis. The management of schools, colleges and universities should use their funds to buy modern educational tools and facilities. Teachers cannot teach effectively when they do not have the essential tools within arm's reach one of themajor hurdles that an educator is bound to encounter is therefore eradicated by ensuring that the necessary tools are within reach. These practical implications underscore the importance ofa comprehensive approach to support educators in overcoming barriers to technology integration. By addressing the unique needs of educators, fostering a culture of collaboration, and building self-efficacy, educational institutions can promote effective technology adoption and enhance teaching and learning outcomes. Ultimately, these strategies can benefit both educators and students, leading to a more engaging and effective educational experience.

7. Recommendations

Training programmes as related to modern technologies, new gadgets, teaching-learning facilitation can help build up confidence among the teachers while handling various technologically enhanced apps and tools as a part of their teaching-learning process. Educational institutions should allocate enough time for each and every topic or hire more professors in a bid to reduce the loads employed by the instructors. This may help teachers in positioning of the numerous teaching and learning materials in the instructional context. Teachers are encouraged to cultivate and build up their time management and their aptitude ofself-organisation. Hence, it is highly recommended that teachers should undertake online self-training programmes so that they can better prepare to deal with issues and better apply the acquired knowledge within classroom context. To introduce the necessities of teachers to the Educational institutions they should develop personal professional development programs. Possible to eliminate such difficulties which have not been addressed by employing a standardmodel. A measure that has been found useful when trying to address the self-efficacy concernis exercising the establishment of the peer mentorship activities that involves experienced teachers supporting their counterparts in the part of technology incorporation.

8. Constraints and Future Study

This needs to be done with understanding some limitations of this research. It might be placeddependent, and the outcomes cannot be directly compared to other classroom settings. Anotherpossible source of bias is that which arises due to the nature of the facts being surveyed; theseare largely self-reported and the processes of adoption are multivariate. Thus, more research isneeded to understand such dynamics within different contexts and in terms of other facets of schooling. To sum up, the barriers do not cause a direct impact on the usage of technology butthe self efficacy and the role of peer support collaboration are the critical factors that enhancethe level of technology utilization. Hence, addressing these aspects will help the educators andthe educational institutions to shift through the hurdles that come with incorporation of technologies to improve the teaching and learning.

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