

CREATING A VIRTUAL COMMUNITY OF PRACTICE THROUGH BLENDED LEARNING IN TEACHER EDUCATION IN SOUTHWEST NIGERIAN UNIVERSITIES

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Abstract

To lessen the impact of the escalating coronavirus pandemic, terrorism, and the reduction in students' academic performance, schools worldwide are switching from onsite to online instruction and adopting digital learning platforms in teacher training. Establishing a virtual community of practice with the support of blended learning and digital learning platforms is necessary to give teachers the practical tools they need in terms of perceived improvements to their teaching abilities and their thorough understanding of their core topic. However, Nigeria's universities have the most difficulty converting their teacher education programmes to online ones. This study looked at the virtual community of practice through blended learning in southwest Nigerian universities (colleges or faculties of education). The study was conducted in stages and used a quasi-experimental design with a control group for the pre-test and post-test. The respondents were divided into experimental and control groups, and the researcher will select the groups with simple, stratified, and purposeful sampling approaches. The sample comprises 92 academic staff members and 252 Bamidele Olumilua University of Education, Science, and Technology students in Ikere, Ekiti, and the Tai Solarin University of Education in Ijebu-Ode. The Virtual Community of Practice results through the Blended Learning in Teachers Education Test (VCPBLTET) were used to evaluate the performance of the 200-level Education Foundation Courses (EFC) students during the academic year 2022-2023. The questionnaire was used to draw responses from the lecturers, while statistical software assessed the collected data. All hypotheses are evaluated at a significance level of 0.05. The findings derived from the study revealed how lecturers in southwest Nigerian universities decided which blended learning implementation method was best for teacher education programs. The study also showed that teacher educators who engage in blended learning to create a virtual community of practice have significantly different professional development outcomes. The findings support the notion that face-to-face and virtual interactions substantially impact how effective blended learning strategies are for training teachers. The study's results confirm that a significant amount of the variation in the use of technology in the classroom can be explained by the predictor variable and its combination. Personal obligations outside the classroom, such as side gigs, also take up teachers' engagement.

As a result, vital structural components must be arranged for blended learning to integrate properly into the community of practice.

Keywords: virtual community of practice, blended learning, preservice teachers, universities, Southwest Nigeria

Introduction

The aim of establishing a virtual community of practice (VCoP) in a higher education context, particularly in the university, is to foster an atmosphere where all teachers and students have advanced to maintain and utilize the internet for teaching and learning. However, pedagogical activities must observe social norms to promote information exchange. Notably, members of this community must be engaged and prepared to participate in blended learning, which combines in-person and online instruction with a solid commitment to fostering synchronous engagement between participants and technology (Suoranta, 2020).

Now that the demand for online education is gaining more ground, academic institutions that do not provide it risk losing prospective students to other schools that use cutting-edge educational strategies, particularly in these times of uncertainty. Due to this turn-around, the university is scrambling to figure out how to switch from traditional lecture delivery techniques to online or virtual ones. Many professors and educators are considering ways to give students a positive learning experience. Best practices require understanding the approaches that will equip academic institutions to face the problems this shift brings. In this time of danger, it is crucial to provide a high-quality online curriculum that will meet Nigerians' needs and keep students off the highways and campuses that have turned into safe havens for kidnappers, herders, shooters, and terrorists.

The information revolution and its related technical advancements have grown significantly in the twenty-first century. The virtual community's influence on education has increased, notably during the COVID-19 epidemic (Gulbahar, 2014). Educational institutions have tried to keep up with these technological advancements and progress towards digitalization. However, for this to be successful, instructors must be able to use, manage, and deploy technology in the classroom successfully. To adapt to new and continuously expanding technologies, lecturers must keep up with further information and techniques. Therefore, a primary goal is to prepare and train lecturers to handle virtual learning professionally. The COVID-19 pandemic made it clear how crucial it is to establish a method of reaching students. Lecturers turned to instructional design to quickly produce educational materials and accomplish the desired learning outcomes during the pandemic. The task of translating the ideas and fundamentals of teaching and learning into workable strategies for developing, enhancing, and continuing education is known as blended learning.

Researchers have used a variety of terminology, definitions, and interpretations to characterize blended learning, which has led to the assertion that it is a "floating signifier" (Gynther, 2016). The term can be used to characterize educational experiences that combine in-person and online

teaching methods instead of entirely online learning, which typically forbids face-to-face interaction and necessitates that students be present in the exact location (Ho, Nakamori, Ho, & Lim, 2016). It is essential to define the tasks involved in each phase to assess how well technology is applied and how online and offline elements are integrated; this is frequently not the case in the studies, as illustrated below. Instead, authors, to varied degrees, break down these elements, frequently being more detailed about the online feature and less about the more traditional, face-to-face encounter. While this might be attributed to instructors and students having a greater understanding of what happens in a regular classroom, additional data is needed to assess how well each model has been incorporated.

Due to removing attendance restrictions based on location or time, blended learning offers teachers much more flexibility than traditional classroom settings. Limitations are fired or made more manageable (Brysch, 2020). As teachers struggle more and more to integrate teaching skills into their increasingly busy schedules, the benefit of skipping a regular in-person session may be crucial (Morina, 2019). Teachers can use their limited spare time for learning development, such as travelling. In-service teachers may be able to take university teacher training courses alongside preservice teachers due to the flexible mode of attendance, forging important links across the many phases of teacher preparation (Zimmermann & Lang, 2019).

According to Owens et al. (2008), communities of practice also allow blended learning programmes to be based in universities, which may boost chances for application to practice and the formation of virtual learning. Lecturers believed that adding an online component to a blended learning programme was essential due to its flexibility, according to Brysch (2020). The combination of different delivery methods increased the likelihood of implementation and sharing. According to one teacher, teachers could watch the online video components of the teaching programme first, use them in their classrooms, and then have face-to-face meetings with other teachers to discuss how students interacted with the materials (Brysch, 2020). Due to their ongoing presence at the place of their professional practice, flexibility benefits teachers by enabling them to participate in teaching career development sessions and complete genuine learning activities (Herrington, Oliver, & Reeves, 2003).

The possibilities that virtual learning platforms offer that help to increase the levels of involvement and engagement between lecturers and their students serve as a reminder of the significance of using them to promote mobile learning in teacher professional development programs. Commonly used blended learning systems offer adaptable and engaging e-learning resources. The most recent models of virtual communities support distance education and training by providing social and interactive learning environments (Malecela, 2016; Al-Ghamdi and Al-Ghamdi, 2015) that permit both synchronous and asynchronous communication (Yang, 2009) and make learning activities more accessible. They also provide flexibility by enabling learning "anytime and anywhere" (Wenger, 2011). Numerous studies have examined the use of virtual learning platforms in teaching

and learning, emphasizing their efficiency in raising students' academic performance and accomplishment.

The COVID-19 pandemic's impacts and the fundamental shifts in the educational landscape make it essential to use virtual learning platforms to prepare teachers for the workplace. For teachers to learn about and develop their cognitive and practical abilities, assessing how well they use these virtual learning platforms is crucial due to the significance of instructional delivery. As a result, it is essential to determine the educational engagement of teachers with these platforms because this element significantly impacts how well teachers perform and master their pedagogical activities.

The current study adds to the body of literature since it clarifies how well virtual learning platforms promote university lecturers' learning engagement and help them become competent in blended learning. It adds to the body of knowledge about virtual learning education in the post-pandemic period; this is especially crucial in Nigeria, where the government strongly focuses on e-learning, including teachers' professional development. It is anticipated that in the future, Nigeria's teachers will primarily rely on a virtual community of practice learning platforms for their professional growth. Therefore, it is crucial to modernize educational services systems by creating and implementing virtual communities, such as using a learning management system (LMS) that can be used in university education. However, how these platforms affect undergraduate teachers' ability to build instructional design abilities has not yet been addressed. Consequently, this study aimed to evaluate the impact of utilizing digital learning tools like LMS on developing instructional learning engagement among preservice teachers in Nigeria.

The National Universities Commission's Learning Management System (LMS) worked on the e-learning programme to improve the standard of instruction at the university level in Southwest Nigeria. The programme will give lecturers the information and abilities needed for e-learning-specific design, development, and learning activities. Its primary focus is e-learning systems appropriate for development environments typified by technological limitations, including constrained hardware and slow Internet connectivity. Lecturers are exposed to the knowledge and abilities required for effective teaching strategies. These include practising with feedback, combining group projects with independent study, customizing learning routes based on learner needs, and using simulation and games.

Statement of the Problem

Even though the world is witnessing the emergence of virtual technology in different areas of life, especially in education, the rate of failure in Education Foundation Courses (EFC) at other universities is increasing. The impact of blended learning on teaching activities, which can be best seen in the pedagogical situation, is now being examined. Combined learning studies have sought to understand the emergence of virtual technologies in teaching and learning on various platforms and texts and how these paths intersected with face-to-face learning. The education industry

recognized the importance of creating a virtual environment with technology integration as a 21st-century tool that teachers and students can use to gain information through associations with one another face-to-face, preparatory learning activities, social engagement, and problem-solving (Gambari, 2017; Penland, 2011; Davidson, 2013).

One can see that a small percentage of lecturers adopt technology in their teaching practices at the university (college or faculty of education) in southwest Nigeria, even though most students are proficient users and consumers of technology. Most students and teachers did not have access to smart boards, laptop computers, mobile phones, or academic software programs; however, it has not been determined why some teachers opt not to use the technology. Technology tools seem not to be available at the university, and there is uncertainty as to whether all teachers will implement these tools in the core curriculum to complement blended learning. Some teachers depend on traditional ways of teaching due to their unfamiliarity with and lack of basic computer skills, which causes them to "struggle to use technology with personal and professional tasks" (Gambari et al., 2017).

However, it has been argued that all studies in this field should, methodologically, be interpreted as case studies, even when they adopt experimental approaches (Holt & Oliver, 2002).

It was noticeable that there was some shortfall in learners' performance and achievement over time, where learners were conceived as passive receivers of teacher information. The onus is now on teachers to change with the learner, playing a more active role and utilizing other resources (both human and non-human) to make the teaching and virtual community of practice more dynamic, rewarding, and engaging. The availability of new technology products for teaching and learning will likely affect traditional teachers' roles.

Research Questions and Hypotheses

We sought to answer the following two research questions and three research hypotheses;

Research question1: To what extent do lecturers involved in a virtual community of practice through blended learning when using learning management system?

Hypotheses

We generate three hypotheses, the following null hypotheses were stated and tested at $\alpha \leq 0.05$ to guide the study.

HO¹: There is no significant difference in the professional development outcomes of teacher educators who participate in a virtual community of practice through blended learning and those who do not.

HO²: There is no significant difference in the effectiveness of blended learning methods in teacher education between virtual and face-to-face interactions.

HO³: The participation of teacher educators in a virtual community of practice has no impact on their integration of technology in classroom teaching.

Theoretical Framework

Disagreement indicates that no single model has emerged to explain how blended learning using VCoP functions; instead, it would be preferable to combine psychological, scientific, and cognitivist theories to support the research (Gambari et al., 2017). It will provide teachers with a broad strategy for resolving learning difficulties associated with using technology in an online environment; the teacher will modify blended learning with the Technology Integration Planning (TIP) model. The concept aims to support or direct instructors' practices and address concerns with beginning teachers and those who are just starting to use mobile or smart devices in the classroom (Roblyer & Doering, 2013). While attempting to join the online community in using technologies to tackle learning difficulties, teachers must follow seven steps. It can either be in three phases, two phases, or two phases after phase one. These actions will help teachers integrate technology into their lesson plans. Now that technology has taken over how education is conducted in the neighborhood (Taslibeyaz, Aydemir, and Karaman, 2017), the totality of the scholar's experience created the TIP model to assist educators in adapting their practices to the technologically-based community and moving forward. Technology integration will become successful and relevant for instructors and students if the TIP framework is implemented (Roblyer & Doering, 2013). With diverse technologies and tactics, blended learning is changing how school instruction is delivered, managed, and assessed. Therefore, it is best to elaborate more on the "blended learning" concept. But, first, a diverse range of technological artefacts, endeavours, and practices ostensibly improve face-to-face encounters rather than a single object. (Selwyn, 2020).

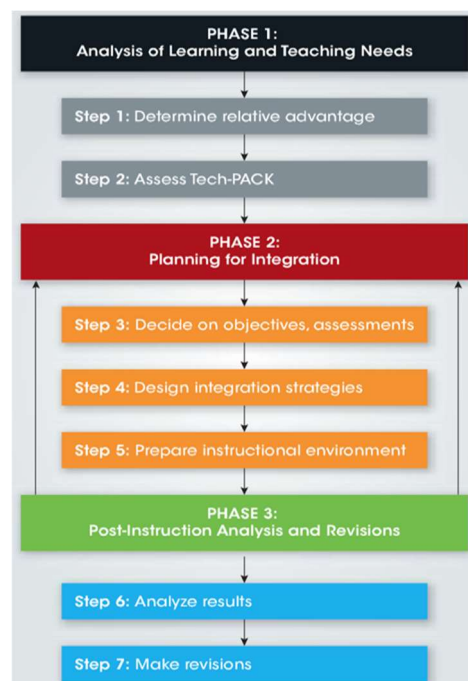


Fig 1 Diagrammatic representation of the TIP model Roblyer & Doering, (2013)

According to Horn and Staker (2014), blended learning can be a flexible paradigm that enables students to switch between learning activities on a flexible timetable based on their requirements. Therefore, the foundation of student learning in a flex model is online learning supported by mobile devices. On the other hand, teachers provide flexible, on-demand assistance with instruction as students' progress through the course's curriculum and content. This technique can allow future instructors much influence over their education. The success of such a program where the fear of infection has curtailed all kinds of activities, including teaching training, depends on the learners' proper participation.

Online learning has been used to satisfy many students' demands in remote areas. Who cannot engage in traditional face-to-face classroom settings, work full-time, only study after work, or want to learn independently? Because of the Boko Haram conflict in Nigeria, terrorism is now the norm. Some militants intimidate, coerce, and cause terror in order to destabilize the growth and development of education. Now commonplace in Nigeria are suicide bombings, vehicle bombings, rocket-propelled grenades, killings, kidnappings, disguised attacks, and hijackings. The operations of Boko haram, herders, armed men, and other parties have claimed the lives of several pupils; as a result, teaching and learning in our nation have faced many difficulties

Literature Review

In order to achieve high-quality learning outcomes, teachers can publish course materials and lessons, create assignments, carry out learning activities, interact with students, and promote learning engagement in Virtual Communities of Practise (VCoP), interactive online learning environments (Alsaedi, 2020). In order to expand the field of learning technology, VCoP aims to encourage the exchange of educational experiences, ideas, conversations, and substantive dialogues (Dziuban, Moskal, Cassisi, and Fawcett, 2016; Ouadoud, Chkouri, Nejari, and Kadiri, 2017). The purpose of these platforms is to provide an interactive learning environment that incorporates multiple sources of knowledge. There are many advantages to VCoP for schooling. They first support learning achievement by providing enough space for storing digital content, enabling the management and retrieval of documents online, and allowing for flexibility in the e-learning environment through the sharing of experiences that foster creativity (Amin, 2021; Dash, 2019). Second, VCoP combined with blended learning facilitates student and teacher engagement and allows them to incorporate a variety of learning resources into their instruction (Yin, 2018).

As a result, it facilitates communication between students and teachers regarding the topics covered in class (Heggart, 2018). Third, VCoP breaks free from temporal and spatial constraints and lowers the cost of digital information for all segments of society, including educational institutions (Al-Dokny, Darwish, Alyoussef, and Al-Abdullatif, 2021).

Students now comprehend their progress on a deeper level. Teaching tools begin with using Google Classroom to record teachers in the classroom and learning experiences. This allows for the recording of specifics about the habits, preferences, and development of the learners (Ogunlade

& Akhigbe, 2018). Students' academic performance is positively impacted by blended learning environments. In fact, beneficial virtual reality tools improve their programming and psychomotor skills (Alotaibi, 2013). Furthermore, interactions with teachers and other students in the classroom assist pupils in identifying their real-world skills and limitations (Williamson, 2020b).

"Virtual communities of practise" (VCoP) are communities of practise (CoP) that have a common understanding of blended values, according to Mason (2002). According to this definition, VCoP belongs to the broader category of socialising theories, which identify a number of traits in common that are contingent on gaining membership. The CoP is predicated on the notion that participation and inclusiveness are essential elements of learning as a social process. As a result, in order to develop a sense of identity and belonging, a person must first go through the process of merging, and shared values also require that there be common practises and meanings. The group's members stated that they joined for a variety of reasons, including the ability to learn from others, collaborate in teams with individuals from other professions, and work more closely with colleagues who shared similar ideals (Abdelmalak, 2015).

Objective(s) of the Study

This study's main objective is to look into the Virtual Community of Practice through Blended Learning in universities in Southwest Nigeria Teachers Programs.

This study examines the Virtual Community of Practice through Blended Learning in universities in Southwest Nigeria Teachers Program.

Explicitly, the study intended to;

1. Examine the extent to which the aims and objectives of blended learning for the teacher program have been achieved in the universities (Colleges/Faculty of Education) in Southwest Nigeria.
2. Determine the frequency at which lecturers of the universities (College/Faculty of Education) in Southwest Nigeria utilized the available virtual resources such as mobile phones and laptops.
3. Examine the effect of the level of compliance of lecturers of universities (College/Faculty of Education) in Southwest Nigeria with a blended method on students' academic performance.
4. Look at the problem affecting blended learning in teacher education in Southwest Nigeria universities.
5. Determine the strategies for effectively implementing Blended learning in the universities in Southwest Nigeria.

Methodology

This study was carried out in two phases. Phase one was designed and developed in a virtual community of practice through blended learning. In contrast, phase two adopted the pretest-

posttest control with a one group of quasi-experimental design. Blended learners was the experimental group, while the control group was the face-to-face learners. The lead researcher hired additional Research Assistance (RAs) for the Principal Investigator due to the complexity of the proposed research (PI). A pre-test was administered to both groups before treatment to ascertain how the students behaved in the beginning and whether there were any variations in their pre-test results. To obtain correct data and maintain reliable records, the Lead researcher teach CPI and RAs.

Phase One

Design Phase

The researcher adopted the Technology Integration Planning (TIP) model to design the blended learning package. The model provides a systematic approach for designing and developing a learning experience in Education Course like Philosophy of education, Educational technology, Sociology of Education, Educational Management.

Analysis

- Problem and need analysis in (Education)
- Learning goals based on blended learning
- Learners' characteristics in terms of level or year spent in school

(ii) Design

- Specify the instructional objectives in Education

(iii) Development

The blended package was based on five design steps, where content analysis, scripting, storyboarding, development, and evaluation was considered essential. Implementation

- The researchers will visit the selected institution to deliver the lesson designed for experimental and control groups, which will last for four weeks. At the close of the study, teachers will engage the participants in an assignment that will be turned in through LMS Platform as part of a blended package obligation.

Phase Two

This phase will adopt the pretest-posttest control group design.

The schematic design below represents the following;

Experimental Group = O1 x O2

Control Group = O3 - O4

X represents Blended Learning Strategy

- represent the conventional method of teaching (Face-to- Face)

One university was placed in the experimental group and treated utilizing blended learning on mobile application resources to teach the Introduction to Teaching Profession, and Foundation of education use for 200-level students in the 2022–2023 session. The researchers provided experimental group topics to the control group, which consists of the other university, to teach. Still, they do so in person using the conventional lecture format. The sample for the study consisted of two public institutions (colleges/faculties of education) in Southwest Nigeria, with two of those universities being randomly selected from the other three. The study involved instructors and students from the Bamidele Olumilua University of Education, Science, and Technology in Ikere-Ekiti and the Tai Solarin University of Education in Ijebu-Ode. Simple random and stratified approaches was used to select respondents from four schools of education in various colleges or faculties.

The test was administered as part of the Virtual Community of Practice through Blended Learning in Teachers' Education Test (VCPBLTET). The VCPBLTET's objective is to determine the mean performance scores of students who have had immediate and sufficient exposure to blended learning using mobile application facilities. Researchers gave 30 multiple-choice items to both groups. The performance test was properly formulated and conducted according to the course learning outcomes. The test content development was in five level: analysis, design, development, implementation and evaluation. In each multiple choice question analysis (6 items) design (6), development (6), implementation (6) and development (6) Face and content validity of the performance test was measured by group of 3 experts in curriculum development, test and measurement and teaching method after presenting the answers key for modification. The Adekunle Ajasin University, Akungba-Akoko faculty of education, was used as a pilot test. It was reliable to use the dependability coefficient. The VCPBLTET instrument, utilized for both the pre- and post-test, was randomly reorganized to prevent students from guessing while taking the test. Researchers gave the test to the experimental and control groups for 50 minutes each. Experts assessed the instrument's reliability calculated using the Cronbach alpha method. The reliability coefficient for the test was 0.89 indicated a high and accepted level of reliability. The students was received the VCPBLTET. The data was examined using statistical methods, including the T-test, ANOVA, ANCOVA, and regression analysis.

Study Sample

The study sample included 252 students and 92 lecturers from Tai Solarin University of Education in Ijebu-Ode and Bamidele Olumilua University of Education, Science and Technology in Ikere-Ekiti on university-based teachers in training. Between the ages of 17 and 21, the education students were enrolled in the second semester of their bachelor's degrees. The participants enrolled in educational courses one of the core courses were chosen to represent the intended sample. On a Learning Management System platform created by TETFUND, the participants underwent blended online learning to learn about instructional design, teacher education, and educational technology.

Data Collection and Analysis

We were permitted to conduct this study by the Centre for Research and Development Ethics Committee of Bamidele Olumilua University of Education, Science, and Technology (approved number CERAD/URTC/ECC-BOUESTI/STA/Vol.011). The data was collected during the 2022–2023 academic year. At the beginning of the first semester, the participants' knowledge of instructional design and educational technology was assessed, as those terms are described in the course. The Tetfund-designed LMS portal was presented to the participants and given a tour so they could learn how to sign up, utilize different tools, do assignments, upload materials, make announcements, communicate with the lecturers, participate in class, take tests, and collaborate with peers. For 4 academic weeks, participants received instruction, and the whole course curriculum which included all necessary exercises, tasks, and assignments was released online. Meanwhile, 8 weeks was allocated for face-to-face learning. In teachers' education learning engagement was measured through a survey questionnaire that consisted of 46 items, which had been designed for this study. The questionnaire consisted of five engagement includes; Blended learning experience, Benefits of Virtual CoPBCTE, Support and Guidance, Future engagement and Motivation to LMS. A total of 46 closed-ended statements were asked to rate their responses in Yes or No, and the participants were asked to rate their responses according to a five-point Likert scale (1= strongly Disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree)

Results

In this study, we aimed to create a virtual community of practice through blended learning in teacher education in southwest Nigeria universities. The result of this study are presented in line with the research questions.

Analysis of Research Questions

Question 1: To what extent do lecturers involved in a virtual community of practice through blended learning when using Learning Management System?

Table 1: Lecturers involvement in a virtual community of practice through blended learning when using learning management system

S/N	ITEMS	YES	NO	MEAN
1.	Are you currently a teacher educator in Southwest Nigeria?	77 (83.7%)	15 (16.3%)	1.84
2.	Do you believe that blended learning can enhance teacher education in Southwest Nigeria?	76 (82.6%)	16 (17.4%)	1.83
3.	Have you experienced increased engagement in your teaching practice through virtual communities of practice?	43 (46.7%)	49 (53.3%)	1.47

4.	Have you received training on how to effectively participate in a virtual community of practice?	41 (44.6%)	51 (55.4%)	1.45
5.	Do you think blended learning can help teacher educators adapt to changing educational trends?	84 (91.3%)	8 (8.7%)	1.91
6.	Do you think a virtual community of practice can help you access a wider range of teaching resources?	69 (75.0%)	23 (25.0%)	1.75
7.	Have you observed an increase in peer support among teacher educators due to virtual communities of practice?	47 (51.1%)	45 (48.9%)	1.51
8.	Do you believe that virtual communities of practice can promote a culture of continuous learning among teacher educators?	77 (83.7%)	15 (16.3%)	1.84
9.	Have you encountered difficulties in accessing training and support for using technology in your teaching practice?	56 (60.9%)	36 (39.1%)	1.61

Criterion mean = 1.50, *Negative item(s) are reversed

Table 1 presents the extent of lecturers' involvement in a virtual community of practice through blended learning when using learning management system. The result shows that only 83% of the total respondents are currently a teacher educator in Southwest Nigeria, 46.7% have experienced increased engagement in teaching practice through virtual communities of practice, 44.6% have received training on how to effectively participate in a virtual community of practice while more than half of the study participants (60.9%) have encountered difficulties in accessing training and support for using technology in teaching practice. Using a criterion mean score of 1.50 for the affirmative of the statements, all the items had mean scores above the cut-off point except items 3 and 4. This implies that the extent of lecturers' involvement in a virtual community of practice through blended learning when using learning management system is moderate.

Testing of Hypotheses

Hypothesis 1: There is no significant difference in the professional development outcomes of teacher educators who participate in a virtual community of practice through blended learning and those who do not.

Table 2: ANCOVA of professional development outcomes of teacher educators who participate in a virtual community of practice through blended learning and those who do not

Source	SS	df	MS	F	Sig.	Partial Eta ²
Corrected Model	43599.254	2	21799.627	252.228	.000	.502
Intercept	78499.571	1	78499.571	908.264	.000	.644
Pretest	49.204	1	49.204	.569	.451	.001
Group	21408.814	1	21408.814	247.706	.000	.331
Error	43300.506	501	86.428			
Total	1202587.000	504				
Corrected Total	86899.760	503				

*p<0.05

Table 2 shows that computed F-value (247.706) with degrees of freedom 1 and 501 was statistically significant at p<0.05 level of significance for the groups. The null hypothesis was rejected. This implies that there is significant difference in the professional development outcomes of teacher educators who participate in a virtual community of practice through blended learning and those who do not. The treatment accounted for about 33.1% ($\text{Eta}^2 = 0.331$) of the observed variance in professional development outcomes of teacher educators. The mean difference among the estimated marginal means descriptive statistics of the groups, after correcting for the other effects in the model is presented in Tables 5.

Table 3: Estimated Marginal Mean on professional development outcomes of teacher educators by treatment

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Virtual interaction	56.048	.706	54.661	57.435
Face-to-face interaction	38.051	.706	36.664	39.438

Table 3 shows that teacher educators exposed to virtual interaction had higher estimated marginal mean than their counterparts in the Face-to-face interaction group. The result further showed that there was significant mean difference between virtual interaction and Face-to-face interaction instructional method in terms professional development outcomes of teacher educators when treatment was administered to them with (means for Virtual interaction = 56.048, Face-to-face interaction = 38.051) respectively.

Hypothesis 3: There is no significant difference in the effectiveness of blended learning methods in teacher education between virtual and face-to-face interactions.

Table 4: t-test showing the effectiveness of blended learning methods in teacher education between virtual and face-to-face interactions

Location	N	Mean	SD	Df	t	p
Virtual interaction	41	4.41	0.67	90	8.751*	0.000
Face-to-face interaction	51	5.71	0.73			

*p<0.05

The result on Table 4 shows that computed t-value (8.751) with degree of freedom 90 was statistically significant at p<0.05 level of significance for the groups. The null hypothesis was rejected. This implies that there is significant difference in the effectiveness of blended learning methods in teacher education between virtual and face-to-face interactions.

Hypothesis 4: The participation of teacher educators in a virtual community of practice has no impact on their integration of technology in classroom teaching.

Table 5: Regression analysis of teacher educators' participation in a virtual community of practice and integration of technology in classroom teaching

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta (β)		
(Constant)	4.334	.648		6.684	.000
Participation of teacher educators in a virtual community of practice	.505	.119	.409	4.251	.000
Multiple R= 0.409, Multiple R ² = 0.167, Adjusted R ² = 0.158, F _{1,90} = 18.068					

*p<0.05

Table 5 shows that participation of teacher educators in a virtual community of practice has impact on their integration of technology in classroom teaching ($F_{1,90} = 18.068$, p<0.05). The null hypothesis is rejected. The table shows that there is a significant positive multiple relationship between the predictor variable (participation of teacher educators in a virtual community of practice) and integration of technology in classroom teaching ($R=0.409$, p<0.05). This implies that the predictor variable is a factor that can exert influence on integration of technology in classroom teaching. The value of the coefficient of determination ($R^2=0.167$) indicates that the predictor variable accounted for 16.7% ($R^2 \times 100$) of the total variance in integration of technology in

classroom teaching while the remaining 83.3% unexplained variance is largely due to other variables not included in the study that can account for integration of technology in classroom teaching. The calculated F-ratio (18.068) was significant at 0.05 level of significance. This implies that the predictor variable jointly provides a significant explanation for the variation in the integration of technology in classroom teaching. The multiple relationship between the dependent and independent variables can therefore be given as follow:

$$Y = 4.334 + 0.505X$$

Where

Y = Integration of technology in classroom teaching

X = Participation of teacher educators in a virtual community of practice

B = Regression Weight Coefficient

A = Constant (other variables other than X)

Discussion

The purpose of this study, which presents its findings, is to create a Virtual Community of Practice through Blended Learning on Teacher Education (VCoPBLTE) in the context of higher education, especially in universities. The goal is to create an environment where all instructors and students have progressed to the point where they use and maintain the Internet for teaching and learning. According to the study, lecturers use learning management systems to facilitate blended learning, and their level of participation in this virtual community of practice is moderate.

Thus, by sharing their teaching experiences, the Learning Management System (LMS) platform established a secure environment for this to happen. VCoPBLTE aims to promote accountability and support, structure successful learning engagement the shared interest and provide them with real-time guidance.

The study also discovered how lecturers in southwest Nigeria decided which blended learning implementation method was best. From a criteria perspective, the best ways to include blended learning in teacher education programmes are to use online platforms for collaborative learning and to participate in virtual communities of practice.

Based on the data shown here, a significant amount of the variation in the use of technology in the classroom can be explained by the predictor variable and its combination. The study's findings indicate that, as these innovations will impact education development, virtual communities of practice aimed at promoting and assisting teachers in using virtual technology must consider the technological challenges encountered in universities. A meticulous plan is necessary to ensure that the technical architecture of a VCoPBLTE supports online interaction and utilization. As Amin (2021) noted, a VCoPBLTE's chances of success are increased when it has access to a suitable LMS and an internet connection.

Recommendation

1. When developing a VCoPBLTE, teachers' professional lives and instructional activities should be considered. Preparing lessons, grading homework, interacting with students and colleagues, and marking assignments are all typical components of teaching duties. Personal obligations outside the classroom, such as side gigs, also take up teachers' engagement. As a result, for blended learning to properly integrate into the community of practice, critical structural components must be arranged.
2. To guarantee active involvement in the VCoPBLTE, it is advised that teachers should be self-regulated, stimulated, have support, and take an active role in the programme.
3. To expand access to the programme, broadband infrastructure must be provided, particularly in underserved communities, to enable blended learning. Government authorities should also abstain from censoring or blocking the Internet because doing so violates people's right to free speech and information access.

Funding:

This research was financed by the Tertiary Education Trust Fund **(Tetfund)**

Acknowledgements

Acknowledgments to the Centre for Research and Development (CERAD) Bamidele Olumilua University of Education, Science, and Technology. Ikere-Ekiti. Other universities involved and research participants.

Conflicts of Interest

The authors declares no conflicts of interest regarding the publication of this paper

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