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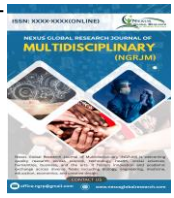

Research Article

The Role of Educational Technology in Building a Culture of Collaboration for Transformative Teacher Education: A Case Study of Teacher Training Institutions in Kebbi State, Nigeria

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ABSTRACT

Educational technology tools are not meant to replace teachers, nor are they intended to micromanage or control how a group of teachers work together. This study explores the role of educational technology in building a culture of collaboration for transformative teacher education, with special focus on teacher training institutions in kebbi state, Nigeria. The study adopted mixed-method approach. A sample of 76 educators was purposively drawn from four teacher training institutions in Kebbi State, Nigeria as participants for the study. Questionnaire and interview schedules were used to collect data from the sampled respondents. The face and content validity of the two instruments was carried out using experts in the field of educational technology and computer science from Kebbi State University of Science and Technology, Aliero. Both instruments were further subjected to pilot testing, and a reliability coefficient of 0.75, 0.80 and 0.78, respectively for the 3 items were determined using Cronbach Alpha formula. Descriptive statistics of mean and standard deviation were used to answer the research questions. Findings revealed (Grand mean score = 3.0) to show that teacher educators in Kebbi State, Nigeria makes use of educational technologies to collaborate with their peers in other institutions, and it also revealed (Grand mean score = 3.0) to indicate that educational technology tools play a significant role in enhancing collaboration practices among teacher educators in Kebbi State, Nigeria. Also, (Grand mean score = 3.2) to revealed certain barriers hindering collaborative culture among teacher educators in Kebbi State, Nigerian. It was therefore recommended that educators should incorporate educational technologies in building a culture of collaboration for transformative teacher education in teacher education institutions in Kebbi State.

Keywords: *Educational Technology, Culture of Collaboration, Transformative Teacher Education, Teacher Training Institutions.*

Introduction

The world is progressing very rapidly due to the development of the Information and Communication Technology (ICT) that comes with the 21st century. The century is attributed to highly advance digital technologies that support artificial intelligence, internet of things, robotics, virtual reality and globalization that changes the economy, agriculture, social, politics and systems of education across the globe.

Education is an important process in human and society's development. It is widely accepted as the dynamic instrument of change and its process involves constant reconstruction of experience, which makes it more meaningful and capable of solving present and future problems (Ibanga, 2016). Hence, the development of any nation especially in this 21st century highly depends upon the quality and quantum of their educated citizens. This is why many nations, including Nigeria, is doing everything possible to achieve high-quality

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education. The nation Nigeria has emphasized in its National Policy on Education the need for quality teacher education (Federal Republic of Nigeria: FRN, 2013). Teacher education is an important catalyst for the education industry, responsible for training quality teachers that are capable of imparting the rightful skills, attitude and knowledge to the citizens for effective national development (Nakosteen *et al.* 2023).

However, education in Nigeria is faced with several challenges, including curriculum overload, large class sizes, inadequate infrastructure, insufficient funding, and a lack of adequate professional development opportunities for educators (Sulaimon & Adebayo, 2023). These issues contribute to the persistent problem of under-qualified teachers, which adversely affects the quality of education across the country (Ikechukwu & Amos, 2023; Chukwuemeka et. al., 2025). With a large and diverse students' population, there is an urgent need to reform teacher education to ensure that teachers are well-prepared to meet the demands of the modern classrooms.

The need for transformative teacher education in Nigeria has become increasingly evident in response to the dynamic demands of contemporary society. The integration of technology has emerged as a pivotal factor in achieving this transformation (Dominic *et al.,* 2021; Chukwuemeka et. al., 2025). The role of technology in education has become increasingly prominent in recent years, with a growing recognition of its potential to enhance teaching and learning processes (Eze & Olusola, 2023). Carpenter and Krutka (2021) had discovered that integration of technology into teacher education programmes holds significant promise for addressing longstanding challenges and fostering a culture of collaboration.

Webster, an online dictionary (2018) defined collaboration as an act of working jointly. As one of the crucial skills necessary for excelling in digitized society, collaboration involves two or more persons working together and supporting each other with ideas, skills, knowledge and resources. Collaboration among educators is crucial for professional growth, knowledge sharing, and the development of innovative teaching practices (Makinde *et al*., 2024). A collaborative culture within teacher education programs can lead to the creation of supportive learning communities where educators can share resources, experiences, and best practices (Sulaimon and Adebayo, 2023). This, in turn, can enhance teaching effectiveness, professional capabilities, improve performances and outcomes. However, building such a culture requires intentional efforts and supportive structures, which can be facilitated by the strategic use of technology.

From video conferencing to audio conferencing to research and project management software, educational technology tools have evolved to simulate traditional teacher interactions for teams of international or remote teachers. Educational technologies include apps or software that streamline and facilitate the collaborative process within virtual teams (Abdullahi & Saidu, 2024; Chukwuemeka & Garba, 2024). With the recent advancements in Artificial Intelligence (AI) and cloud-based computing, educational technologies are more powerful now than ever before, while also being reliable and secure (Raji *et al.*, 2024). Collaborative

tools are not meant to replace teachers, nor are they intended to micromanage or control how a group of teachers work together. Instead, the technology is intended to reduce the time teachers spend on repetitive difficult tasks, thereby leaving more time and energy to spend on more meaningful work such as research (Shen *et al.*, 2023; Chukwuemeka, 2025). Educational technology falls into two broad categories, depending on the type of communication they support: synchronous or asynchronous.

Ibrahim and Aina (2023) described synchronous communication simply as a real time communication. That is to say, this form of communication occurs when two or more teachers collaborate at the same time using either video or audio calls, or instant messaging technologies like Google Docs, a cloud-based document editor which allows multiple users to edit and comment on a document simultaneously in real-time. Adeshina (2024) opined those synchronous technologies enables teams to work together seamlessly, regardless of their physical location, while enhancing productivity and fostering collaboration. On the other side, asynchronous communication does not require members to be present at the same time. Tolorunleke et al. (2023) have maintained that asynchronous collaboration usually happens at one's convenient time using any of email, message boards and shared documents technologies. Shen *et al* (2023) had suggested further that collocated technologies are other forms of collaborative technologies designed for teams working in the same physical location, using tools like interactive whiteboards and local network collaboration software.

Integration of technology into teacher education in Nigeria will offers a promising pathway to building a culture of collaboration. By leveraging technological tools and opportunities, Nigerian educators can overcome existing challenges, enhance their professional development, and work collectively towards transformative educational outcomes. Therefore, this study hopes to explore how educational technology can be a catalyst for creating a collaborative and transformative teacher education in Nigeria.

Statement of the Research Problem

In recent years, the use of educational technologies has increase significantly in Nigeria; however, it is not without challenges such as limited access to reliable electricity supply, limited access to reliable internet, inadequate technological infrastructure, and digital literacy gaps among teachers to mention but the few. Afolabi and Olatunji (2022) reported that despite these obstacles, there are initiatives and policies that aimed at integrating technology into education in Nigeria. Although governments and other stakeholders are investing in ICT (Information and Communication Technology) to enhance educational quality and accessibility, however, previous studies regarding teachers' use of technology have indicated that educators across all levels of learning in Nigeria minimally use technology to teach their students. The major questions on the mind of educational stakeholders are, how can we better enhance educators' use of technology in our various tertiary institutions? How can we enhance collaboration among educators that will enable them to connect, communicate, and overcome existing challenges, enhance their professional

development, and work collectively towards transformative educational outcomes particularly in tertiary institutions of learning? The disparity in level of educational resources among institutions further exacerbates these issues, leading to inequities in educators' productivity. It is in light of these challenges, therefore, the researchers set to assess the role of educational technology in building a collaborative culture, and the transformative potential of technology within this context.

Objectives

The study is guided by the following objectives:
1. To find out the extent at which teacher educators make use of educational technology tools to collaborate with the peers in other teachers training institutions.
2. To assess the impact of educational technology tools and platforms on collaborative practices among teacher educators in Kebbi State, Nigeria.
3. To identify challenges to the effective integration of educational technology in fostering collaboration among teacher educators in Kebbi State, Nigeria.

Research Questions

The following research questions were formulated in line with the stated objectives.
1. To what extent do teacher educators make use of educational technology tools to collaborate with the peers in other teachers training institutions?
2. What role does educational technology play in facilitating collaboration among teacher educators in Kebbi State, Nigeria?
3. What are the barriers to effective educational technology integration in fostering a collaborative culture among teacher educators in Kebbi State, Nigerian?

Methodology

Research Design

The study adopted a descriptive survey research design and used a mixed-methods approach (Quantitative and Qualitative) to generate and interprets data. Adeyemi (2018) had opined that by not being limited to a single method of research, the researcher can answer their research questions comprehensively and thoroughly. While quantitative data presented the overall picture of a problem, qualitative data gave the relevant explanatory details.

Population of the Study

The population for this study includes all lecturers in tertiary institutions in Kebbi State, while the target population for this study comprised of lecturers from the school of education in 4 teacher training institutions in Kebbi State, namely, Adamu Augie College of Education Argungu, Waziri Umaru Federal Polytechnic Birnin Kebbi, Federal University Birnin-Kebbi and Kebbi State University of Science and Technology, Aliero.

Sample and Sampling Techniques

A total of 76 respondents were selected using purposive sampling technique. This sampling size was selected in line with Krejcie and Morgan table (1970) for the determining sample size from a given population.

Data Collection Tools

This research employed questionnaire and in-depth interview to generate data from the participants.

Validity and Reliability of the Research Instruments

The instruments for this research were subjected to face and content validity by experts in the field of Educational Technology and Computer Science experts from Kebbi State University of Science and Technology, Aliero who assessed the comprehensiveness, adequacy and clarity of the items in the instruments. The reliability of the instrument was established through a pilot study and reliability coefficients of 0.75, 0.80 and 0.78 respectively for the 3 items were determined using Cronbach Alpha formula.

Method of Data Analysis

The data collected through the quantitative study was analysed using mean and standard deviation. A mean response of 3.0 was considered as benchmark in this study. This is because the decision mean of 3.0 on a 5-point Likert scale is a well-justified and commonly accepted threshold for interpreting survey responses (Jamieson, 2004). It leverages the inherent properties of the scale, and provides a clear distinction between agreement and disagreement, and facilitates straightforward analysis and interpretation of the data in survey research, making it a useful tool for evaluating the effectiveness of programmes or interventions like the teacher-community relationship. Furthermore, qualitative data gathered through the interviews were analysed through descriptive analysis and used direct quotations of participants' opinions in order to increase the validity of the results. More so, the data were organised according to Sub-themes as it was structured in the interview schedules.

Results and Discussion

Results

The extent at which teacher educators make use of educational technology tools to collaborate with their peers in other teachers training institutions

Table 2: Mean and Standard Deviation on Educators' Opinion on the role of Educational Technology Tools in enhancing collaboration Practices among Teacher Educators:

SN	Items	N	X	SD	Decision
i	Educational technologies helps teacher educators to share resources and materials with colleagues in other institutions	76	3.9	1.08	Agree
ii	Educational technologies helps to facilitate communication and feedback among teacher educators	76	3.1	1.19	Agree
iii	Educational technologies helps to support collaborative planning and curriculum development among teacher educators	76	3.0	1.24	Agree
iv	Educational technologies helps to enhance quality and frequency of collaboration among teacher educators	76	3.3	1.54	Agree
v	Educational technologies helps to facilitate professional development and learning communities among teacher educators	76	3.4	1.80	Agree
vi	Educational technologies helps to facilitate the exchange of ideas, experiences, and resources, which can significantly enhance teaching effectiveness	76	3.0	1.76	Agree
vii	Educational technologies helps to facilitate collective research initiatives, and enable teacher educators to work together on educational innovations and improvements	76	3.7	1.17	Agree
Grand Mean		**3.3**		**Agree**	

Table 2 displays mean and standard deviation on educators' opinion on the role of educational technology tools in enhancing collaboration practices among teacher educators in Kebbi State Nigeria. Specifically, educators reported that educational technologies help them to share resources and materials with colleagues in other institutions. This is represented with a mean score of 3.9 and standard deviation of 1.09. Similarly, educators have indicated that educational technologies help to facilitate communication and feedback among teacher educators with a mean score of 3.1 and standard deviation of 1.19. Also, educators have responded positively that educational technologies help to support collaborative planning and curriculum development among them. This is shown with a mean score of 3.0 and standard deviation of 1.24. Furthermore, educators have attested positively to the fact that educational technologies help to enhance quality and frequency of collaboration among them, with a mean score of 3.3 and standard deviation of 1.54. Regarding how educational technologies has help to facilitate professional development and learning communities among teacher educators, educators has responded positively with mean score of 3.4 and standard deviation of 1.80. Additionally, educators have indicated a positive response on how the use of educational technologies has help to facilitate the exchange of ideas, experiences, and resources, which can significantly enhance teaching effectiveness. This is represented with mean score of 3.0 and standard deviation of 1.76. More so, educators have responded that the use of educational technologies has equally help to facilitate collective research initiatives among them, while they work together on educational innovations and improvements. The summary of the table reveals the grand mean score of 3.1 which is greater than the decision mean score of 3.3. This implies that majority of the sampled educators have indicated that educational technology tools plays a significant role in enhancing collaboration practices among teacher educators in Kebbi State Nigeria.

What are the barriers to effective educational technology integration in fostering a collaborative culture among teacher educators in Kebbi State, Nigerian?

Table 2: Mean and Standard Deviation on Educators' Opinion on the Barriers to effective Educational Technology integration in fostering Collaboration Practices among Teacher Educators

SN	Items	N	X	SD	Decision
i	Limited access to educational technologies hindered teacher educators from effective collaborate with colleagues in other institutions	76	3.2	1.62	Agree
ii	Insufficient training, and support for teacher educators reduced effective collaboration with colleagues in other institutions	76	3.7	1.17	Agree
iii	Inadequate educational technology infrastructure and maintenance in teacher education institutions hindered teacher educators from effective collaboration	76	3.8	1.03	Agree
iv	Lack of technological pedagogical content knowledge among educators hindered effective collaboration	76	3.0	1.78	Agree
v	Limited access to reliable internet services affects effective collaboration	76	3.4	1.54	Agree
vi	Limited digital literacy skills and resources limits effective collaboration among teacher educators	76	3.0	1.76	Agree
vii	Cyber security concerns and online safety issues hindered effectively collaboration	76	2.7	1.49	Disagree
Grand Mean		**3.2**			**Agree**

Table 3 above reveals participants' responses on the barriers to effective educational technology integration in fostering collaboration practices among teacher educators. It was revealed that limited access to educational technologies hindered teacher educators from effective collaborate with colleagues in other institutions. This is represented with the mean score of 3.2 and standard deviation of1.62. Also, the table revealed a mean score of 3.7 and standard deviation of 1.17, indicating that insufficient training, and support especially on technology integration and collaboration hindered effective collaboration among teacher educators. Item three which states that inadequate educational technology infrastructure and maintenance in teacher education institutions hindered teacher educators to effective collaboration, received a mean score 3.8 and standard deviation of 1.03. Similarly, educators reported that lack of technological pedagogical content knowledge among them hindered effective collaboration. This received the mean score of 3.0 and standard deviation of 1.78. Regarding limited access to reliable internet services and how it affects effective collaboration among teacher educators; the respondents have expressed their concerns with a mean score of 3.4 and standard deviation of 1.54. Additionally, the educators have expressed that limited digital literacy skills and resources among teacher educators limits effective collaboration. This is revealed through a mean score of 3.0 and standard deviation of 1.76. Contrarily, respondent did not consider cyber security concerns and online safety issues as hindrances to effectively collaboration, with a mean score of 2.7 and standard deviation 1.49. On a general note, analysis of table 3 reveals the grand mean score of 3.2 which is more than the decision mean score of 3.0. This implies that majority of the sampled educators have considered these barriers to effective educational technology integration in fostering a collaborative culture among teacher educators in Kebbi State, Nigerian

Results of In-Depth Interviews with Teacher Educators

After analyzing the results, we conducted in-depth interviews with 6 educators who were chosen randomly from the teacher educators who had been selected for the study.

Regarding the use of educational technologies for collaboration, majority of those who participated in the interview (5 educators) reported that they make use of educational technology platforms, applications and sites like Zoom Application, Google meet, Facebook, Instagram, and WhatsApp among others to connect with peers, mentors, specialists/professors, individually or in professional groups to share ideas and resources, discuss challenges and sometimes undertake joint researches together. Although, they are using educational technology to collaborate with other professionals, however, it was not frequent as expected. A participant (1 educator) responded that he have never participated in any online discussion forum or collaborate with any professional using technology. But he has engaged in face-to-face consultations with professional and colleagues around him.

Another area discussed during the interviews was the role educational technology tools play in enhancing collaboration practices among teacher educators. Majority of educators who participated in the interview (5 educators)

considered educational technology as the backbone of educational innovations, which made collaboration possible. According to the participants educational technology offers numerous online tools and platforms that offer support and enhance collaborative among educators. They cites online learning management systems, discussion forums, social media, video and audio conferencing, and host of other collaborative software has helped them to connect, share, communicate, and collaborate with professionals regardless of geographical locations. The other participant who has never used educational technology to collaborate attested to the fact that eventhough he does not educational technology in that regard, but acknowledge the important role technology is playing in today's education landscape.

Regarding the barriers to effective collaboration among educators, the participants interviewed have identified certain challenges they considered to be limiting effective collaborative culture among teacher educators in teacher training institutions in Kebbi State, Nigerian. Some of the obstacles they identified include: poor educational technologies infrastructures, limited reliable internet access, poor electricity supply, low digital literacy skills among educators, insufficient funding, insufficient training, and support and some forms of resistance to change among others. Based Based on the challenges identified, the participants suggested ways of improving the effective culture of collaboration, which include: improved funding and support, provision of educational technologies in teacher training institutions, organizing conferences and workshops were educator will learn about the new normal in education and be trained on digital skills.

Discussion

The findings of this study have provided in-depth evidence to the role of educational technology in building a culture of collaboration for transformative teacher education in Kebbi State, Nigeria. The findings from both quantitative and qualitative studies revealed:

Firstly, that teacher educators in Kebbi State, Nigeria partially makes use of educational technologies to collaborate with their peers in other institutions. This finding is in agreement with the finding of Adebayo *et al.* (2023) whose study discovered that educators in tertiary institutions in Nigeria make use of digital platforms to connect with professional across the globe to enhancing their teaching. It is also in conformance with the finding of Sulaimon and Adebayo (2023) whose study reported that educators in Nigeria explores various opportunities offered through collaboration to empowering themselves and enhance their professional development for sustainable education. Tolorunleke *et al.* (2023) reported in their findings that collaboration is a practice not only among teachers but students who uses online collaborative tools for learning and for improving their academic performance. In support of this finding, Olumorin *et al.* (2022) has reported that teachers across all level of education in Nigeria are harnessing the power of technology to bridge the Urban-Rural divide, which provide equal opportunities for professional growth through educational technologies. Nevertheless, the reason for the minimal use of educational technology among educators may be due to

the fact that most of the teacher training institutions in the state lacks educational technology infrastructure, access to reliable internet services and poor electricity supply to facilitate technology integration and collaboration (Dominic *et al.,* 2021). There is also limited digital literacy among educators in teacher education institutions in Nigeria as reported by Raji *et al* (2024).

Secondly, the finding also revealed that educational technology tools play a significant role in enhancing collaboration practices among teacher educators in Kebbi State, Nigeria. This finding is in line with the finding of Adebayo *et al.* (2023) which highlighted that the use of digital educational technology platforms is aiding educators' professional development significantly and improved their pedagogical skills through collaboration, which enables sharing of educational resources, including teaching materials, lesson plans among others for collective growth. The finding corroborate with the finding of Eze and Olusola (2023) who found in their study that educational technology tools like the social media and professional networks allow educators to build connections with peers, mentors, and experts globally for global resources and networks which help to inspire teachers to adopt innovative teaching practices and implement them to local contexts. Through online discussions and webinars teachers often engage in continuous professional development, accessing up-to-date information and pedagogical strategies (Roberts & Pruitt, 2021). In their findings, Darling-Hammond *et al.* (2020) have discovered that collaborative technological tools can provide opportunities for excellent. The study revealed further that collaborative technology facilitates joint projects and research initiatives, enabling teachers to work together on educational innovations and pedagogical improvements. Hence, the use of interactive and engaging educational technological tools can motivate educators to participate in collaborative activities with professionals and professional learning communities.

Thirdly, the findings of the study have discovered certain barriers in fostering collaborative culture among teacher educators in Kebbi State, Nigerian. Some of the obstacles that were discovered in this study to impede collaboration include: limited access to educational technologies, insufficient training, and support especially on technology integration and collaboration, lack of technological pedagogical content knowledge among educators, limited access to reliable internet services, and limited digital literacy skills and resources among educators in teacher education institutions. The finding of this study is in consonance with Adeoye (2018), Ogunleye (2019) and Sulaimon and Adebayo (2023) whose study identified lack of technological infrastructures in institutions as basic hindrance to building a collaboration culture among educators. This is buttressed further by the high level of infrastructural decay in the nations' teacher education institutions. The finding correspond with the finding of Raji *et al* (2024) whose study discovered a limited digital literacy and limited access to reliable internet services as strong impediments to implementation of educational technologies like Artificial Intelligence (AI) and virtual environments and other collaborative technologies in Nigeria's tertiary institutions. This is in addition to some forms of resistance to change shown

by some educators (Dominic *et al.*, 2021). In support of this finding, Afolabi (2017) had observed in his study a low level of educational technologies implementation in institutions in south western Nigeria. He reported insufficient training of educators and lack of support especially on technology integration as key factors that have helped to limit collaboration among educators. Hence, the challenges identified have affected the development of collaborative culture in teacher education institutions in Nigeria.

Conclusion

The role of educational technology integration in Nigeria teacher education institutions is offering a promising pathway to building a culture of collaboration. By leveraging education technological tools and platforms, educators can collaborate to overcome existing challenges, enhance their professional development, and work collectively towards transformative teacher education in Kebbi State, Nigeria. There is no doubt that certain barriers have poised challenge to building effective collaboration culture among educators, however, these challenges can be resolved with effective implementation of educational technology and commitments from all stakeholders.

Recommendations

Based on the findings of this study, the following recommendations were made.

1. Educators should incorporate educational technologies in building a culture of collaboration for transformative teacher education in teacher education institutions in Kebbi State.

2. Education actors should provide a leveling field that will foster a culture of collaboration through educational technology so as to significantly improve teacher education landscape.

3. Immediate steps must be taken to enhance collaboration among educators in teacher education institutions in Kebbi State. This includes establishing robust training programs, engaging various stakeholders in contributing to technological advancements in education, and aligning professional practices with technological tools.

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