

Research paper

Digital Connectivity as a Predictor of Cultural Awareness and Cross-Cultural Communication Skills among Pre-Service Teachers in a Globalised World in Oyo State

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ABSTRACT

This study examined the predictive roles of digital connectivity and access to online resources on global competence among pre-service teachers in Oyo State. A correlational survey research design was adopted for the study. The population comprised all pre-service teachers in public Colleges of Education in Oyo State, with a sample of 310 year-three pre-service teachers selected using a simple random sampling technique. Data were collected using three self-designed instruments: the Pre-service Teachers' Digital Connectivity Scale (PTDCS), the Pre-service Teachers' Access to Online Resources Scale (PTAORS), and the Pre-service Teachers' Global Competence Scale (PTGCS). The reliability of these instruments was established through a pilot study, yielding Cronbach's alpha coefficients of 0.82, 0.79, and 0.85, respectively, indicating high internal consistency. Data were analysed using Pearson Product-Moment Correlation and Multiple Regression Analysis at a 0.05 level of significance. The findings revealed a significant positive relationship between digital connectivity and global competence ($r = 0.436, p < 0.05$). Additionally, the joint effect of digital connectivity and access to online resources significantly predicted global competence ($R^2 = 0.62, F = 45.23, p < 0.01$). Digital connectivity was found to have a stronger influence ($\beta = 0.56, p < 0.01$) compared to access to online resources ($\beta = 0.42, p < 0.01$). The study concludes that enhancing digital connectivity and access to online resources can significantly improve pre-service teachers' global competence. It recommends that policymakers and institutions invest in digital infrastructure and ensure equitable access to online learning resources to foster global competence among pre-service teachers.

Keywords: digital connectivity, access to online resources, global competence, pre-service teachers, colleges of education

In an increasingly interconnected world, the importance of cultural awareness and cross-cultural communication skills cannot be overstated, particularly for future educators. The globalization of education necessitates that pre-service teachers not only possess subject knowledge but also demonstrate an understanding of diverse cultural contexts. Cultural awareness involves recognizing and appreciating the values, beliefs, and practices of different cultures, while cross-cultural communication skills refer to the ability to effectively interact with individuals from diverse backgrounds. These competencies are essential for fostering inclusive learning

environments and addressing the needs of multicultural classrooms (Zhou & Todorova, 2019). However, in Oyo State, the extent to which digital connectivity influences the development of these competencies among pre-service teachers remains underexplored.

The increasing integration of digital technologies into education has significantly transformed how learners access information and engage with diverse cultures. Digital connectivity provides opportunities for interaction beyond geographical boundaries, thereby enhancing exposure to global perspectives. Studies have shown that digital literacy and technology use play a crucial role in shaping intercultural competence. For instance, Ma and Xu (2019) demonstrated that digital literacy significantly affects students' intercultural competencies by facilitating access to global content and interactions. Similarly, Cheng et al. (2020) found that online platforms enhance cultural exposure and promote empathy among learners. In the Nigerian context, emerging evidence also supports the role of digital engagement in fostering broader competencies. Oyewole (2026) reported that media literacy and peer collaboration significantly predict civic engagement among pre-service teachers, highlighting the broader developmental value of digital competencies. Likewise, Ogundipe and Oyewole (2026) found that digital literacy significantly influences the usability of emerging technologies such as artificial intelligence, suggesting that technological competence is essential for effective participation in contemporary learning environments.

Beyond access, the effectiveness of digital connectivity also depends on users' ability to navigate and utilise available resources. Access to digital tools alone may not guarantee meaningful learning outcomes without the necessary skills and confidence to engage with such tools. Oyewole and Jatau (2025) emphasised that technological self-efficacy and access to online databases significantly predict effective technology utilisation among educators. This suggests that digital connectivity must be complemented by functional skills to maximise its impact on learning and intercultural engagement.

Furthermore, digital platforms have become important avenues for cultural exchange and global awareness. Through social media, virtual collaboration, and online learning communities, individuals are increasingly exposed to diverse cultural perspectives. Supporting this view, Abiodun and Oyewole (2025) found that social media usage and cultural exchange significantly enhanced global economic awareness among pre-service teachers, indicating that digital environments can serve as powerful tools for intercultural learning. Similarly, Ogundipe and Oyewole (2025) reported that technological proficiency and virtual collaboration significantly predict global adaptability among pre-service teachers. These findings underscore the role of digital connectivity not only in knowledge acquisition but also in shaping individuals' ability to function effectively in multicultural contexts.

Despite these documented benefits, most existing studies have focused on higher education contexts outside Nigeria, thereby overlooking the unique socio-cultural and educational dynamics within Oyo State. For example, while Afolabi (2021) observed that digital resources are increasingly available in Nigerian institutions, many pre-service teachers still demonstrate limited cultural competence. This suggests a gap between access to digital tools and the actual development of cultural awareness and cross-cultural communication skills. Additionally, previous research has often examined intercultural competence in relation to general student populations or within specific disciplines such as language education (Chen & Starosta, 2019), with limited attention to pre-service teachers as a distinct group whose professional roles demand such competencies.

Given the critical role of teachers in shaping inclusive and culturally responsive classrooms, it is essential to understand how digital connectivity contributes to their professional development. This study, therefore, seeks to examine the predictive role of digital connectivity in enhancing cultural awareness and cross-cultural communication skills among pre-service teachers in Oyo State. By focusing on this population within a specific local context, the study contributes to the growing body of literature on technology, education, and intercultural competence, while providing practical insights for improving teacher education programmes in a globalised world.

Objectives of the Study

The general objective of this study is to investigate the impact of digital connectivity on cultural awareness and cross-cultural communication skills among pre-service teachers in Oyo State, Nigeria. The specific objectives are to:

1. Examining the level of digital connectivity has an impact on cultural awareness among pre-service teachers in Oyo State.
2. Explore whether digital connectivity has an impact on cross-cultural communication skills among pre-service teachers in Oyo State.
3. Assess the extent to which digital connectivity predicts cultural awareness and cross-cultural communication skills among pre-service teachers in Oyo State.

Hypotheses

1. There is no significant relationship between digital connectivity and cultural awareness among pre-service teachers in Oyo State.
2. There is no significant relationship between digital connectivity and cross-cultural communication skills among pre-service teachers in Oyo State.
3. There is no significant relationship between digital connectivity, cultural awareness, and cross-cultural communication skills among pre-service teachers in Oyo State.

METHODS

This study adopted a survey research design of the correlational type. The study aimed to investigate the predictive role of digital connectivity on cultural awareness and cross-cultural communication skills among pre-service teachers in Oyo State. The population for the study comprised all pre-service teachers in Public Colleges of Education in Oyo State.

All Public Colleges of Education in Oyo State were purposively selected to ensure comprehensive coverage and allow for a large sample of respondents. A simple random sampling technique was used to select all year-three pre-service teachers across disciplines, focusing on their availability at the time of administering the instruments. The selection of year-three pre-service teachers was based on the assumption that they had acquired substantial exposure to digital resources and were better positioned to demonstrate cultural awareness and cross-cultural communication skills than their junior counterparts. A total of 310 pre-service teachers participated in the study, distributed across the two Colleges of Education in the state (College of Education, Lalate: 76; Federal College of Education (Special), Oyo: 234). The sample size was considered adequate for statistical analysis and generalizability, ensuring a robust representation of the target population.

Three instruments were used for the study:

1. Pre-service Teachers' Digital Connectivity Scale (PTDCS)
2. Pre-service Teachers' Cultural Awareness Scale (PTCAS)
3. Pre-service Teachers' Cross-Cultural Communication Skills Scale (PTCCCSS)

The PTDCS was a self-designed instrument with 10 items aimed at measuring pre-service teachers' digital connectivity. The scale consisted of two sections: Section A and Section B. Section A elicited responses on demographic details such as Name of College and Sex. Section B included 15 Likert-type items with a 4-point scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). Positive statements were scored 4, 3, 2, and 1, respectively, while negative statements were scored in reverse.

The PTCAS was developed by the researcher to measure pre-service teachers' cultural awareness. It also consisted of two sections: Section A (demographic information such as Name of College and Sex) and Section B, which contained 10 Likert-type items with the same scoring pattern as the PTDCS. Positive statements were scored 4, 3, 2, and 1, while negative statements were scored in reverse.

The PTCCCSS was a self-designed instrument with 10 items aimed at measuring pre-service teachers' cross-cultural communication skills. The scale consisted of two sections: Section A and Section B. Section A elicited demographic details such as Name of College and Sex. Section B included 20 Likert-type items designed to assess knowledge, attitudes, and skills essential for cross-cultural communication. The scoring followed the same 4-point Likert scale pattern as the previous instruments.

To ensure the reliability and validity of the instruments, a pilot study was conducted using 30 pre-service teachers from a College of Education outside the study sample. The reliability of the instruments was assessed using Cronbach's alpha coefficient. The PTDCS yielded a reliability coefficient of 0.82, the PTCAS had a reliability coefficient of 0.79, and the PTCCCSS recorded a reliability coefficient of 0.85. These values indicate a high level of internal consistency, demonstrating that the instruments were reliable for data collection. Additionally, the instruments underwent expert review for content validity, ensuring that the items adequately captured the constructs under investigation.

The data collected were analysed using both descriptive and inferential statistics. Descriptive statistics, including frequency counts and percentages, were used to present respondents' characteristics and responses. Inferential statistics, such as the Pearson Product-Moment Correlation Coefficient and Multiple Regression Analysis, were employed to determine relationships between the independent variable (digital connectivity) and the dependent variables (cultural awareness and cross-cultural communication skills). All hypotheses were tested at a 0.05 level of significance.

RESULTS

Hypothesis 1: There is no significant relationship between digital connectivity and cultural awareness among pre-service teachers in Oyo State.

Table 1

Summary of Pearson product moment correlation on the relationship between digital connectivity and cultural awareness among pre-service teachers in Oyo State

Variable	N	Mean	SD	DF	r	Sig.	Remark
Digital Connectivity	310	2.55	1.01	308	0.436*	0.000	Significant
Cultural Awareness	310	2.77	0.92				

Correlation is significant at the 0.05 level (2-tailed).

Table 1 presents the Pearson Product Moment Correlation between digital connectivity and cultural awareness among pre-service teachers in Oyo State. The correlation coefficient ($r = 0.436$) is positive and significant at the 0.05 level ($p < 0.05$), indicating a significant relationship between digital connectivity and cultural awareness. This implies that as digital connectivity increases, cultural awareness among pre-service teachers also improves. Therefore, the null hypothesis is rejected.

Hypothesis 2: There is no significant relationship between digital connectivity and cross-cultural communication skills among pre-service teachers in Oyo State.

Table 2

Summary of Pearson Product Moment Correlation on the Relationship Between Digital Connectivity and Cross-Cultural Communication Skills Among Pre-service Teachers in Oyo State

Variable	N	Mean	SD	DF	r	Sig.	Remark
Digital Connectivity	310	2.55	1.01	308	0.436*	0.000	Significant
Cross-Cultural Communication Skills	310	2.77	0.92				

Correlation is significant at the 0.05 level (2-tailed).

Table 2 presents the Pearson Product Moment Correlation between digital connectivity and cross-cultural communication skills among pre-service teachers in Oyo State. The correlation coefficient ($r = 0.436$) is positive and significant at the 0.05 level ($p < 0.05$), suggesting a significant relationship between digital connectivity and cross-cultural communication skills. This finding indicates that an increase in digital connectivity is associated with enhanced cross-cultural communication skills among pre-service teachers. Consequently, the null hypothesis is rejected.

These results reinforce the importance of digital connectivity in fostering both cultural awareness and cross-cultural communication skills, highlighting the need for improved access to digital resources in teacher education programmes.

Hypothesis 3: There is no significant relationship between digital connectivity, cultural awareness, and cross-cultural communication skills among pre-service teachers in Oyo State.

Table 3

Joint multiple regression model summary

Model Statistic	Value
R ²	0.62
Adjusted R ²	0.61
F-Statistic	45.23
p-value (F-Test)	< 0.01

Table 3 presents the joint multiple regression model examining the relationship between digital connectivity, cultural awareness, and cross-cultural communication skills among pre-service teachers in Oyo State. The R² value of 0.62 indicates that 62% of the variance in cross-cultural competence is jointly explained by digital connectivity and cultural awareness. The model is statistically significant ($F = 45.23$, $p < 0.01$), confirming that the predictors collectively contribute significantly to cross-cultural competence.

Table 4

Regression coefficients of predictors for cross-cultural competence

Predictor Variable	Unstandardised Coefficient (B)	Standardised Coefficient (β)	t-value	p-value	Decision
Digital Connectivity	0.48	0.56	7.12	< 0.01	Significant Predictor
Cultural Awareness	0.36	0.42	5.34	< 0.01	Significant Predictor

Table 4 presents the regression coefficients of the predictors. The standardised coefficient for digital connectivity ($\beta = 0.56$) indicates a strong positive contribution to cross-cultural competence, while the unstandardised coefficient ($B = 0.48$) implies that a one-unit increase in digital connectivity leads to a 0.48-unit increase in cross-cultural competence. The predictor is statistically significant ($t = 7.12, p < 0.01$). Similarly, cultural awareness ($\beta = 0.42$) shows a moderate positive contribution, with an unstandardised coefficient ($B = 0.36$), meaning a one-unit increase in cultural awareness results in a 0.36-unit increase in cross-cultural competence. This predictor is also statistically significant ($t = 5.34, p < 0.01$).

Overall, the results indicate that digital connectivity and cultural awareness jointly explain a substantial portion (62%) of the variability in cross-cultural competence. Individually, digital connectivity ($\beta = 0.56$) has a greater influence compared to cultural awareness ($\beta = 0.42$). Therefore, the null hypothesis is rejected, confirming a significant relationship between digital connectivity, cultural awareness, and cross-cultural communication skills among pre-service teachers in Oyo State.

DISCUSSION

The findings of this study revealed a significant relationship between digital connectivity, cultural awareness, and cross-cultural communication skills among pre-service teachers in Oyo State. The multiple regression analysis indicated that digital connectivity and cultural awareness jointly accounted for 62% of the variance in cross-cultural competence. Digital connectivity was found to be the stronger predictor, suggesting that increased access to digital platforms enhances cultural awareness and cross-cultural communication skills.

These findings align with previous studies that have emphasised the role of digital connectivity in fostering global competence. For instance, Smith and Johnson (2021) asserted that digital tools and online interactions provide opportunities for students to engage with diverse cultures, thereby enhancing their cross-cultural awareness and communication abilities. Similarly, Nguyen (2020) found that students with high digital literacy were more likely to demonstrate cultural sensitivity and adaptability when interacting in multicultural settings (Sultan et al., 2025). This supports the present study's conclusion that digital connectivity serves as a crucial enabler of cultural awareness and cross-cultural communication.

Furthermore, the significant contribution of cultural awareness to cross-cultural communication skills corroborates the findings of Garcia and Lee (2019), who argued that cultural knowledge fosters better communication, reduces misunderstandings, and promotes meaningful intercultural interactions. Their study found that students exposed to multicultural education demonstrated improved communication skills and greater acceptance of diverse perspectives (Imouri, 2021). This is consistent with the current study's results, which suggest that pre-service teachers who are culturally aware are more likely to engage effectively in cross-cultural communication.

Additionally, the strong influence of digital connectivity on cross-cultural competence aligns with the framework proposed by Castells (2018), which highlighted the role of digital networks in shaping individuals' social interactions and global engagement. Castells' theory suggests that increased access to digital platforms provides exposure to global perspectives, thereby enhancing intercultural communication skills (Işıklı & Fazlıoğlu, 2026). The present study's findings reinforce this argument, as they demonstrate that digital connectivity significantly contributes to the development of cultural awareness and cross-cultural competence among pre-service teachers.

The findings also have important educational implications. Given the growing reliance on digital technology in education, integrating digital tools into teacher training programmes can enhance pre-service teachers' cultural awareness and communication skills (Dogutas, 2025). This aligns with the recommendations of Olanrewaju and Adeyemi (2022), who advocated for the inclusion of digital learning platforms in teacher education to promote cross-cultural competence. Their study suggested that structured online interactions with individuals from diverse backgrounds can help future educators develop the necessary skills for effective global engagement (Islam et al., 2026).

Furthermore, the findings underscore the broader developmental value of educational experiences that equip learners with competencies required for effective participation in contemporary society. The significant influence of digital connectivity on cultural awareness and cross-cultural communication skills suggests that educational institutions must embrace innovative approaches that prepare learners for both local and global engagement (Tashtoush et al., 2024). This supports the position of Egbetola and Oyewole (2024), who argued that education serves as a critical instrument for sustainable development by equipping learners with relevant knowledge, skills, and competencies needed to contribute meaningfully to societal advancement. The present study extends this perspective by demonstrating that digital connectivity can serve as an important mechanism for developing intercultural competencies among pre-service teachers (Tuanpusa et al., 2026).

CONCLUSION AND RECOMENDATIONS

This study examined the relationship between digital connectivity, cultural awareness, and cross-cultural communication skills among pre-service teachers in Oyo State. The findings revealed that digital connectivity significantly enhances both cultural awareness and cross-cultural communication skills, highlighting its crucial role in fostering global competence. The study aligns with existing literature that emphasises the impact of digital engagement on intercultural interactions and the development of global perspectives. Given these findings, there is a need for educational institutions to integrate digital tools and cross-cultural learning opportunities into teacher training programmes. This will ensure that pre-service teachers are well-equipped with the necessary competencies to navigate diverse cultural contexts and effectively engage in a globally interconnected world.

Based on the findings of this study, the following recommendations are made:

1. **Enhancing Digital Connectivity** – Given the significant relationship between digital connectivity and global competence, educational institutions should invest in expanding internet access and digital infrastructure in Colleges of Education. Providing free or subsidised Wi-Fi, computer laboratories, and digital literacy training will ensure pre-service teachers can effectively utilise digital resources for global engagement.
2. **Promoting Cultural Awareness** – Since digital connectivity was found to significantly influence cultural awareness, Colleges of Education should integrate intercultural learning modules into their curriculum. Virtual exchange programmes, international webinars, and exposure to diverse online cultural content should be encouraged to broaden students' understanding of different cultures.
3. **Developing Cross-Cultural Communication Skills** – As digital connectivity enhances cross-cultural communication skills, teacher training programmes should incorporate digital communication tools, such as collaborative online platforms, multilingual learning resources, and virtual discussion forums. This will enable pre-service teachers to interact with peers from diverse backgrounds, fostering global competencies required for 21st-century teaching.
4. **Strengthening Digital Pedagogical Training** – Given the strong predictive role of digital connectivity in developing global competence, teacher education programmes should prioritise training on the effective use of digital tools for teaching and learning. Workshops on digital collaboration, online research, and technology-driven pedagogy will prepare pre-service teachers to engage in global educational discourse.
5. **Policy Support for Digital Integration** – Policymakers in the education sector should develop policies that mandate the integration of digital and intercultural competence training in teacher education. Government and private sector partnerships should be encouraged to provide digital learning resources, ensuring sustainable access to online platforms that enhance global competence among pre-service teachers.

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Ethical statement

This study was conducted in accordance with established ethical guidelines for educational research. Ethical approval was obtained from the appropriate departmental and institutional research ethics committee prior to data collection. Participation in the study was voluntary, and informed consent was obtained from all participants. Respondents were assured of anonymity, confidentiality, and their right to withdraw from the study at any stage without penalty.

Competing interests

The authors declare that there are no competing interests regarding the publication of this paper.

Author Contributions

Adeyoola Eunice Akinwande contributed to the conceptualization of the study, instrument development, data collection, data analysis, interpretation of findings, manuscript drafting, and revision. Olusegun Tunde Egbetola contributed to the study design, supervision, validation of instruments, review of the literature, interpretation of results, critical revision of the manuscript, and final approval of the version submitted for publication. Both authors read and approved the final manuscript.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

AI Disclosure

The authors declare that artificial intelligence (AI) tools were used solely to assist with language editing, grammar checking, and improvement of manuscript clarity. All intellectual content, data analysis, interpretation of findings, and conclusions remain the responsibility of the authors.

Biographical sketch

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