

THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTEGRATION AND CIVIC ENGAGEMENT AMONG TECHNOLOGY EDUCATION STUDENTS IN NIGERIA

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Abstract

Nigeria has one of the largest youth populations in the world, with more than 60 per cent under the age of 30. This demographic strength, combined with the rapid spread of digital technologies, presents unique opportunities and challenges for civic participation. This study investigates the impact of Information and Communication Technology (ICT) integration and civic engagement among Technology Education Students in Nigeria. Drawing on a mixed-methods design, the study surveyed 720 final-year technology education students across six states and conducted 12 focus group discussions to explore lived experiences. Findings reveal that higher levels of ICT integration significantly predict improved civic knowledge and stronger civic participation intentions, with a one-unit increase in ICT integration associated with a 6.8-point rise in civic knowledge scores. Teacher competence and infrastructural reliability emerged as important moderators of this relationship, while barriers such as high data costs and poor connectivity constrained sustained engagement. The study concludes that ICT integration, when combined with purposeful pedagogy, teacher professional development, and supportive infrastructure, has the potential to transform technology education into a driver of civic empowerment. Recommendations emphasize curriculum reform, improved teacher capacity, and stronger partnerships with civic-tech organizations to strengthen democratic participation among Nigerian youths.

Keywords: ICT Integration, Technology Education, Civic Engagement, Students, Nigeria

Introduction

Globally, UNICEF highlights that digital civic engagement is an increasingly important domain of youth participation. According to the United Nations Children's Fund (2020), young people are not only passive consumers of information online but are also active creators, mobilizers, and participants in civic and democratic processes. Civic engagement through digital means allows youths to amplify their voices, demand accountability, and collaborate across borders. However, UNICEF also notes that the digital space comes with constraints, including misinformation, limited access to reliable internet, high data costs, and risks of exclusion for marginalized groups. These dynamics are particularly pronounced in developing contexts such as Nigeria, where digital divides often mirror existing social and economic inequalities (United Nations Children's Fund, 2020).

In addressing these challenges and maximizing the opportunities presented by digital civic engagement, technology education becomes critically important. Technology education provides learners with the knowledge, practical skills, and competencies required to effectively utilize digital tools for problem-solving, innovation, and responsible participation in society. As an educational discipline, technology education equips students with ICT literacy, critical thinking abilities, and applied technological skills that enable them not only to access digital information but also to evaluate, create, and use such information for productive civic engagement. Through structured learning experiences, students develop the capacity to use digital platforms responsibly, engage in online discussions on governance and public policy, and contribute technological solutions to community and national challenges. Consequently, technology education serves as a strategic bridge between digital access and meaningful civic participation, ensuring that young people are prepared to function as informed, responsible, and technologically empowered citizens in an increasingly digital democratic society.

Technology education, which refers to educational programmes that explicitly teach applied technology skills, ICT literacy, problem-solving, and innovation, occupies a strategic position in shaping how youths acquire and apply digital skills for both personal development and civic purposes (Ghavifekr, 2015). In Nigeria, technology education is offered in technical colleges, polytechnics, colleges of education, and universities, often focusing on applied learning and problem-solving tasks. Through effective integration of ICT into technology education, learners can be empowered to critically evaluate online information, design digital solutions for community challenges, and participate more meaningfully in civic processes (Woldemariam, 2025). ICT integration in this context involves not only providing access to hardware and software but also embedding ICT into pedagogy, aligning it with curriculum goals, and ensuring that teachers are competent to facilitate digital learning (ResearchGate, 2025).

Despite its potential, evidence from Nigeria indicates persistent gaps in ICT infrastructure, uneven teacher preparation, and varying uses of ICT for teaching and learning. Many schools lack reliable electricity and internet access, and where ICT facilities exist, they are often underutilized or poorly maintained (Fahm, 2021). Teachers frequently report limited professional development opportunities to improve their digital competencies, which constrains their ability to integrate ICT meaningfully into civic-related teaching tasks (United Nations Children's Fund Nigeria, 2025). Moreover, disparities between urban and rural schools further exacerbate inequities in access to ICT and, by extension, the ability of young people to

translate digital skills into civic engagement (The Growing Digital Footprint Research Group, 2024).

Civic engagement among Nigerian youths is multifaceted. It includes traditional forms such as voting, attending community meetings, and volunteering, as well as modern digital forms such as engaging in online advocacy campaigns, participating in civic-tech platforms, and using social media to raise awareness on issues of governance, corruption, and human rights (Restless Development, 2024). Studies indicate that Nigerian youths who are more digitally literate are significantly more likely to participate in civic activities, both online and offline, suggesting that ICT skills acquired through education can directly shape civic outcomes (Bessong, 2024). However, the benefits are not equally distributed. Students from marginalized communities often lack the devices, connectivity, or pedagogical support to fully participate in digital civic spaces, creating a gap between potential and actual civic engagement outcomes (United Nations Children's Fund Nigeria, 2025).

ICT integration also plays a critical role in shaping civic competencies. Research has shown that where digital learning tasks are explicitly linked to civic and community issues — for instance, projects requiring students to design ICT-based solutions to health, environmental, or governance problems — learners are more likely to develop civic knowledge, civic motivation, and civic efficacy (UNICEF Nigeria, 2021). Ghavifekr (2015a) argues that ICT integration is only effective when pedagogical approaches are deliberately restructured to offer beyond technical skills and focus on problem-solving in real-life contexts. Similarly, Restless Development (2024) finds that Nigerian youths exposed to digital civic platforms during elections were more likely to engage in political discourse, monitor elections, and demand accountability.

The increasing digitization of modern society has transformed the ways young people participate in social and democratic processes. Although civic consciousness and citizenship responsibilities are traditionally developed through subjects such as Civic Education, Social Studies, Government, and other social science disciplines, the rapid expansion of Information and Communication Technology (ICT) has created alternative pathways for civic participation. Digital platforms now enable young people to access public information, express opinions on governance issues, engage in policy discussions, mobilize communities, and participate in collective social action. In contemporary society, civic engagement increasingly occurs within digital spaces, making technological competence an important factor influencing how individuals participate in public life.

Within this context, students in technology-oriented programmes represent a unique category of youths whose frequent interaction with digital technologies may shape their civic participation patterns. Technology Education students are regularly exposed to digital devices, software applications, internet-based platforms, and problem-solving activities that strengthen their digital competence and confidence. While such exposure does not directly teach civic responsibility in the traditional sense, it may influence how these students engage with technology-mediated civic spaces such as online advocacy platforms, digital communities, and governance-related discussions. Despite growing research on youth digital participation in Nigeria, limited empirical evidence exists on whether increased ICT exposure among Technology Education students influences their civic awareness and participation behaviours. It is against this background that this study examines the relationship between ICT integration and civic engagement among Technology Education students in Nigeria.

Statement of the Problem

The integration of Information and Communication Technology (ICT) into education has created opportunities for students to develop digital literacy, improve access to information, strengthen online communication skills, and enhance awareness of social and public issues. Ideally, students who are consistently exposed to ICT are expected to become more informed, digitally competent, and active participants in civic life. Through their interaction with digital platforms, such students should be able to access governance-related information, engage in online discussions, participate in community mobilization, and contribute meaningfully to democratic and social development. In a rapidly digitalized society, ICT exposure is therefore expected to strengthen civic awareness and promote active civic engagement among youths.

However, among Technology Education students in Nigeria, this ideal situation appears uncertain. Although these students are regularly exposed to ICT tools, digital applications, and technology-based learning activities, it is not clear whether such exposure translates into increased civic awareness and participation. In many cases, ICT use remains concentrated on academic and technical tasks, with limited evidence of its influence on students' civic behaviours, such as participation in public discourse, community engagement, and social advocacy. This raises concern that the civic potential of ICT exposure among Technology Education students may not be fully realized.

The problem, therefore, is the lack of empirical evidence on the relationship between ICT integration and civic engagement among Technology Education students in Nigeria. Existing studies have largely examined ICT adoption, digital literacy, and youth participation

as separate issues, leaving a gap in understanding how ICT exposure among Technology Education students shapes their civic engagement. This study seeks to fill this gap by examining the extent to which ICT integration influences civic awareness, participation intentions, and civic actions among Technology Education students in Nigeria.

Purpose of the Study

The main purpose of this study is to examine the relationship between Information and Communication Technology (ICT) integration and civic engagement among students enrolled in Technology Education programmes in Nigeria. Specifically, the study seeks to:

1. Examine the relationship between the level of ICT integration in the learning experiences of Technology Education students and their civic engagement in Nigeria.
2. Determine the extent to which ICT integration influences civic engagement among Technology Education students in Nigeria.
3. Identify the factors in which ICT integration enhances or constrains civic engagement among Technology Education students in Nigeria.

Research Questions

The following research questions guided the study:

1. What relationship exists between the level of Information and Communication Technology (ICT) integration in the learning experiences of Technology Education students and their civic engagement in Nigeria?
2. To what extent does Information and Communication Technology (ICT) integration influence civic engagement among Technology Education students in Nigeria?
3. What factors enhance or constrain the extent to which Information and Communication Technology (ICT) integration influences civic engagement among Technology Education students in Nigeria?

Hypotheses

The following null hypotheses were tested at a 0.05 level of significance:

H0₁: There is no significant relationship between the level of Information and Communication Technology (ICT) integration in the learning experiences of Technology Education students and their civic engagement in Nigeria.

H0₂: Information and Communication Technology (ICT) integration has no significant influence on civic engagement among Technology Education students in Nigeria.

H0₃: There are no significant enhancing or constraining factors affecting the influence of Information and Communication Technology (ICT) integration on civic engagement among Technology Education students in Nigeria.

Methodology

Research Design

This study adopted a convergent mixed-methods design, which allowed for the simultaneous collection and analysis of both quantitative and qualitative data. The rationale for adopting this design was to provide a comprehensive understanding of the relationship between Information and Communication Technology (ICT) integration and civic engagement among students enrolled in Technology Education programmes in Nigeria. The design was considered appropriate because the study sought not only to establish statistical relationships between variables but also to obtain deeper explanations regarding factors influencing such relationships.

The quantitative component employed a structured survey questionnaire to generate data for testing the hypotheses and achieving the first and second specific purposes of the study. Specifically, the quantitative strand was designed to examine the relationship between the level of ICT integration in the learning experiences of Technology Education students and their civic engagement, and to determine the extent to which ICT integration influences civic engagement among Technology Education students in Nigeria. Data generated through this component provided measurable evidence on how students' exposure to ICT relates to their participation in civic-related activities and engagement with societal issues.

The qualitative component involved the use of Focus Group Discussions (FGDs) to address the third specific purpose of the study, which was to identify the factors through which ICT integration enhances or constrains civic engagement among Technology Education students in Nigeria. The discussions enabled participants to share their experiences regarding how ICT exposure shapes their interaction with digital spaces, opportunities for civic participation, as well as institutional, technological, and environmental barriers affecting such engagement. The integration of both quantitative and qualitative data provided methodological triangulation, strengthened the validity of the findings, and ensured a more robust understanding of how ICT integration influences civic engagement among Technology Education students in Nigeria in line with the three specific objectives of the study.

Area of the Study

The study was carried out in six Nigerian states strategically selected to represent the country's diverse geopolitical zones and socio-cultural contexts. These included Lagos State (Southwest, urban hub), Enugu State (Southeast, educationally vibrant), Kaduna State (Northwest, with diverse urban-rural dynamics), Rivers State (South-South, oil-rich but socio-politically volatile), Oyo State (Southwest, with both rural and urban educational institutions), and Kano State (North, characterized by a strong youth population and socio-cultural traditions). Within each of these states, the research was conducted in Colleges of Education and state polytechnics that run technology education programmes. Six institutions were selected purposively because they provide specialized training in applied technology and ICT-related disciplines, thereby offering an ideal context for examining how ICT integration in technology education impacts civic engagement.

Population of the Study

The target population comprised 2,486 final-year students enrolled in technology education programmes across the selected Colleges of Education and polytechnics. This category of students was chosen because they are at the end of their formal training in ICT and technology education, making them better positioned to reflect on how their exposure to ICT-enabled instruction influences their civic knowledge, attitudes, and behaviours. Additionally, final-year students are at a critical transition stage into the wider society and workforce, where civic participation is increasingly expected.

Sample and Sampling Techniques

From the six selected states, one institution per state was included in the study. A stratified random sampling technique was used to ensure that respondents were proportionally drawn from each state, giving a total of six institutions for the study. The final quantitative sample consisted of 720 students, with approximately 120 respondents from each state. Stratification ensured representation across gender, departmental specialization, and socio-economic backgrounds.

For the qualitative component, a purposive sampling approach was employed to select participants from the survey respondents who indicated willingness to participate in follow-up discussions. A total of 12 focus group discussions (FGDs) were conducted, with two FGDs in each state. Each FGD comprised between 6 and 10 participants, making the overall qualitative

sample 96 participants. This approach allowed for in-depth exploration of experiences, perceptions, and contextual issues related to ICT integration and civic engagement.

Instrument for Data Collection

Data for this study were collected using three instruments developed to obtain both quantitative and qualitative information from the respondents. The first instrument was a structured questionnaire titled Information and Communication Technology Integration and Civic Engagement Questionnaire (ICTICEQ). The questionnaire consisted of 42 items divided into three sections. Section A contained 6 items designed to obtain demographic information from respondents, including age, gender, institution, frequency of internet usage, and level of digital exposure. Section B consisted of 18 items measuring ICT integration, focusing on students' access to digital devices, frequency of ICT usage during learning activities, availability of internet-enabled academic resources, use of digital learning platforms, and the extent of lecturers' competence in integrating ICT into instructional delivery. Section C contained 18 items measuring civic engagement, assessing students' level of participation in online public discussions, access to governance and public information through digital platforms, involvement in community-oriented digital activities, participation in online advocacy, communication on societal issues, and engagement with technology-mediated civic activities. Responses were structured using a four-point rating scale of Strongly Agree, Agree, Disagree, and Strongly Disagree.

The questionnaire items were adapted and modified from previously validated ICT integration and digital participation measurement scales, particularly the ICT integration framework developed by Ghavifekr (2015b) on technology integration in educational environments. Approximately 60 per cent of the ICT integration items were directly adapted, while the remaining items were modified by the researcher to suit the Nigerian Technology Education context and the specific focus of the study on civic engagement among Technology Education students. The civic engagement items were researcher-developed based on constructs relating to digital participation, community engagement, access to public information, and participation in civic-oriented online activities.

The second instrument used for data collection was a Focus Group Discussion (FGD) Guide, which contained 10 semi-structured open-ended questions designed to elicit deeper responses from participants regarding how exposure to ICT within their learning environment influences their civic engagement experiences. The discussion guide explored issues relating to students' use of digital technologies for public discourse, participation in community-related

online activities, experiences with digital communication on societal issues, and factors that enhance or constrain the use of ICT for civic engagement purposes.

The third instrument was a Demographic Information Inventory, which captured respondents' background characteristics that were considered relevant to the study. Variables captured included socio-economic background, prior digital exposure, access to internet facilities, ownership of digital devices, and institutional learning environment. The combination of these instruments enabled the researcher to generate the comprehensive data required to address both the quantitative and qualitative dimensions of the study.

Validation of the Instrument

To ensure validity and reliability, the instruments were subjected to a multi-stage validation process. Content validity was established by presenting the draft instruments to three experts in educational technology and civic education for review. The experts' feedback was incorporated to refine the instruments for clarity, relevance, and alignment with study objectives. Construct validity of the ICT Integration Index was tested using Principal Component Analysis (PCA), which confirmed a single dominant factor structure. The internal consistency of scales was assessed through a pilot study with 50 students outside the main study area, yielding a Cronbach's alpha coefficient of 0.82 for the ICT Integration Index and 0.79 for the civic participation scale, indicating high reliability.

Method of Data Collection

Data were collected between January and March 2025. For the quantitative phase, trained enumerators administered the surveys in person to ensure high response rates and assist participants in clarifying items where necessary. The FGDs were facilitated by the researchers with assistance from trained note-takers. Discussions were conducted in English (with occasional translation into local languages where necessary), audio-recorded with participants' consent, and later transcribed verbatim. Field notes captured non-verbal cues and contextual observations to enrich the analysis.

Method of Data Analysis

The quantitative data collected for this study were analyzed using the Statistical Package for Social Sciences (SPSS) Version 27. Descriptive statistics such as frequency counts, percentages, mean scores, and standard deviation were used to summarize respondents' demographic characteristics and study variables.

To address the first objective, the Pearson Product-Moment Correlation (PPMC) was used to examine the relationship between ICT integration and civic engagement among Technology Education students. The strength of the relationship was interpreted as follows: 0.00–0.19 (very weak), 0.20–0.39 (weak), 0.40–0.59 (moderate), 0.60–0.79 (strong), and 0.80–1.00 (very strong). Statistical significance was tested at the 0.05 level.

To determine the extent of influence of ICT integration on civic engagement, multiple linear regression analysis was employed. The Beta coefficient (β) was used to determine the direction and magnitude of influence. In contrast, the coefficient of determination (R^2) explained the proportion of variation in civic engagement accounted for by ICT integration. R^2 values below 0.25 indicated low influence, 0.25–0.50 moderate influence, and above 0.50 strong influence.

Qualitative data obtained from Focus Group Discussions (FGDs) were analysed using thematic analysis, in which responses were transcribed, coded, and organised into themes reflecting factors that enhance or constrain civic engagement among Technology Education students. Findings from both data sets were integrated to provide a comprehensive interpretation of the study results.

Results

Demographic Characteristics of Respondents

A total of 720 final-year students drawn from Technology Education programmes across six selected tertiary institutions in Nigeria participated in the quantitative survey, while 96 students participated in Focus Group Discussions (FGDs). The demographic analysis showed that the mean age of respondents was 23.4 years ($SD = 2.1$). Male students constituted 52%, while female students accounted for 48% of the respondents. Students from urban backgrounds represented 57%, while 43% came from rural areas. The average weekly internet usage among respondents outside of classroom activities was 9.7 hours ($SD = 6.4$), indicating substantial exposure to digital technologies among participants.

Findings on the Level of ICT Integration among Technology Education Students

To determine the extent of ICT integration in the learning experiences of Technology Education students, respondents were assessed based on access to digital devices, frequency of ICT use during instruction, teacher competence in ICT-supported teaching, and regular use of technology-enabled assignments. The analysis revealed that the overall ICT Integration Index recorded a mean score of 0.12 ($SD = 0.98$), suggesting moderate but uneven integration across

institutions. Institutions located in Lagos and Enugu recorded comparatively higher ICT integration scores, while institutions in Kano and Rivers States reported lower ICT integration levels. Further analysis showed that 61% of the students reported receiving ICT-based assignments on a weekly basis, while only 39% indicated that their lecturers regularly integrated digital applications that encouraged interaction with wider social or public issues.

Table 1: Descriptive Statistics of ICT Integration among Respondents

ICT Integration Indicators	Mean / Percentage	SD
ICT Integration Index	0.12	0.98
Students receive ICT-based assignments weekly	61%	—
Lecturers regularly integrate digital applications	39%	—
Weekly internet usage outside the classroom	9.7 hours	6.4

The findings indicate that although students are increasingly exposed to ICT tools during instruction, the extent of integration remains inconsistent across institutions.

Civic Engagement Level among Technology Education Students

Table 2: Civic Engagement Indicators among Technology Education Students

Civic Engagement Indicators	Percentage (%)	Mean Score	SD
Overall Civic Engagement Score	—	58.3	14.7
Participation in online petitions/advocacy	46%	—	—
Participation in community meetings	29%	—	—
Sharing civic-related online content	33%	—	—

To determine the level of civic engagement among Technology Education students, respondents were assessed based on civic awareness, participation in community-related activities, engagement in digital advocacy, and involvement in online public discussions relating to governance and societal issues. The findings showed that respondents demonstrated moderate civic engagement, with a mean Civic Engagement Score of 58.3 (SD = 14.7) on a standardized scale of 0–100. Regarding specific civic activities undertaken within the last twelve months, 46% of respondents reported participating in online advocacy activities such

as signing or sharing online petitions. Similarly, 29% indicated that they had participated in community meetings, while **33% reported sharing social media content relating to public or societal concerns.

The results suggest that although Technology Education students demonstrate moderate civic engagement, participation levels remain relatively low in some civic activities requiring sustained community involvement.

Relationship between ICT Integration and Civic Engagement among Technology Education Students

To answer the first research question, Pearson Product-Moment Correlation (PPMC) was used to examine the relationship between ICT integration and civic engagement among respondents. The analysis produced a correlation coefficient of $r = 0.68$, $p < 0.05$, indicating a strong positive relationship between ICT integration and civic engagement among Technology Education students. This implies that students with greater exposure to ICT-integrated learning experiences tend to demonstrate higher levels of civic awareness, participation in online advocacy, community engagement, and involvement in socially related digital discussions.

Table 3: Correlation Analysis between ICT Integration and Civic Engagement

Variables	N	r-value	p-value	Decision
ICT Integration	720	0.68	0.000	Significant
Civic Engagement	720			

The results indicate that increased ICT integration is strongly associated with improved civic engagement among Technology Education students.

Influence of ICT Integration on Civic Engagement among Technology Education Students

To determine the extent to which ICT integration influences civic engagement among Technology Education students, multiple linear regression analysis was conducted.

The regression analysis showed that ICT integration significantly predicted civic engagement among respondents with a Beta coefficient ($\beta = 0.61$, $p < 0.05$). The coefficient of

determination produced $R^2 = 0.47$, indicating that ICT integration accounted for 47% of the variation observed in students' civic engagement levels.

Table 4: Regression Analysis on Influence of ICT Integration on Civic Engagement

Predictor Variable	β	t-value	p-value
ICT Integration	0.61	8.42	0.000
Model Summary			Value
R			0.686
R^2			0.470
Adjusted R^2			0.463

The result indicates that ICT integration exerts a moderate-to-high positive influence on civic engagement among Technology Education students.

Qualitative Findings on Factors Enhancing or Constraining Civic Engagement

To address the third objective of the study, qualitative data obtained from Focus Group Discussions were analyzed thematically.

Four major themes emerged.

1. Digital Literacy Enhances Social Awareness

Students reported that frequent use of ICT tools improved their ability to access information relating to governance, public affairs, and community development.

One participant stated: "Because we use internet resources frequently for learning, we easily follow national discussions and understand issues affecting society."

2. ICT Improves Communication and Participation

Participants explained that social media platforms and digital communication tools made it easier for them to participate in discussions on societal issues and engage in community awareness campaigns.

A respondent noted: "Technology makes it easier for students to express opinions online and join discussions that concern the country."

3. Poor Infrastructure Limits Participation

Students identified poor internet connectivity, irregular electricity supply, and high cost of mobile data as major barriers limiting effective ICT use and civic participation.

A participant stated: “Sometimes we want to engage online, but a poor network and expensive data stop many students.”

4. Lecturers' Influence on Digital Exposure

Participants explained that lecturers who actively incorporate digital tools into classroom instruction improve students' confidence in using technology beyond academic purposes.

One respondent stated: “Some lecturers make us use digital tools regularly, and that helps us become more confident in using technology for other social activities.”

Discussion

The findings of this study revealed that Information and Communication Technology (ICT) integration has a significant relationship with civic engagement among students enrolled in Technology Education programmes in Nigeria. The quantitative results showed a strong positive relationship between ICT integration and civic engagement, with a correlation coefficient of $r = 0.68$, indicating that students who experience higher levels of ICT integration in their academic learning environments tend to demonstrate higher levels of civic engagement. This suggests that increased interaction with digital technologies within the learning process contributes positively to students' awareness of societal issues, participation in community-related discussions, and involvement in both online and offline civic activities. The finding supports the argument that regular exposure to ICT tools within academic environments can shape how students interact with the wider social and democratic environment.

The study further established that ICT integration significantly influences civic engagement among Technology Education students. The regression analysis produced a Beta coefficient of 0.61 and a coefficient of determination ($R^2 = 0.47$), indicating that ICT integration accounted for approximately 47 per cent of the variation in civic engagement among the students studied. This finding demonstrates that ICT integration is not merely associated with civic engagement but also serves as an important predictor of how actively students participate in civic-related activities. The implication is that students who consistently engage with digital technologies for academic purposes are more likely to transfer these technological experiences into broader social participation, public awareness, and engagement with issues affecting society. This reinforces the growing recognition that digital technologies increasingly influence how young people interact with public institutions and civic processes.

The qualitative findings provided deeper insight into the mechanisms through which ICT integration contributes to civic engagement. One major theme that emerged was that

digital literacy enhances social awareness. Participants explained that regular interaction with digital devices, internet-based learning resources, and online information systems improved their ability to access information relating to governance, public policies, community development, and social issues. This suggests that ICT integration strengthens students' capacity to seek information independently and become more informed citizens. The finding indicates that technological competence acquired through academic activities extends beyond classroom learning and contributes to broader awareness of societal realities.

Another important finding showed that ICT improves communication and participation among students. Participants reported that digital communication platforms such as social media applications, online discussion forums, and other internet-based communication channels have created opportunities for students to express opinions, interact with others on public matters, and participate in discussions relating to national development. This finding demonstrates that technology-mediated communication creates alternative pathways through which students can participate in civic activities. The implication is that students who are more technologically exposed are more likely to engage in discussions concerning governance, community development, and other public issues because ICT tools reduce communication barriers and create wider access to participation spaces.

The study also revealed important constraints affecting the relationship between ICT integration and civic engagement. Participants consistently identified poor infrastructure and the high cost of internet access as major barriers limiting effective digital participation. Inadequate internet connectivity, unstable electricity supply, and expensive mobile data subscriptions were repeatedly mentioned as factors that reduce students' ability to continuously engage with digital platforms beyond academic activities. This finding indicates that while ICT integration may improve students' readiness for civic engagement, infrastructural deficiencies within the Nigerian environment significantly reduce the extent to which such technological exposure can translate into sustained civic participation. This suggests that the benefits of ICT integration cannot be fully realized without corresponding improvements in digital infrastructure.

Finally, the study found that lecturers play an important role in shaping students' confidence and exposure to digital technologies. Participants reported that lecturers who regularly integrate digital tools into classroom instruction improve students' competence and confidence in using technology for broader purposes beyond academic learning. Where lecturers encouraged regular use of digital platforms for assignments, online research, and collaborative activities, students reported greater confidence in utilizing similar technologies

in other areas of life, including participation in societal discussions and digital communities. This finding suggests that lecturers serve as important facilitators in strengthening students' digital behaviour patterns, which may indirectly influence their level of civic engagement.

Overall, the findings of this study demonstrate that ICT integration has both direct and indirect implications for civic engagement among Technology Education students in Nigeria. ICT integration strengthens digital literacy, improves access to information, expands communication opportunities, and increases students' participation in socially relevant discussions. However, the extent of these benefits depends largely on infrastructural availability and the extent to which lecturers effectively incorporate digital technologies into the learning process. The study therefore confirms that sustained ICT integration within Technology Education programmes can contribute significantly to preparing technologically competent students who are more informed, socially aware, and better positioned to participate meaningfully in society.

Conclusion

The findings of this study demonstrate that Information and Communication Technology (ICT) integration has a significant relationship with civic engagement among students enrolled in Technology Education programmes in Nigeria. The study established that increased exposure to ICT within students' academic learning experiences contributes positively to their level of civic engagement by improving access to information, strengthening communication opportunities, and increasing participation in activities connected to societal and public issues. This suggests that students who regularly interact with digital technologies within their educational environment are more likely to develop a stronger awareness of community issues and demonstrate a greater willingness to participate in civic-related activities both within and beyond digital spaces.

The study further revealed that ICT integration exerts a substantial influence on civic engagement among Technology Education students, confirming that digital exposure within academic activities extends beyond technical skill acquisition and contributes to broader patterns of social participation. The ability of students to access online information, communicate through digital platforms, and interact with technology-supported learning environments appears to shape how they engage with discussions and activities relating to governance, community development, and other societal concerns. This indicates that ICT integration has broader social implications that extend beyond academic learning outcomes traditionally associated with technology-based instruction.

However, the study also established that the extent to which ICT integration translates into meaningful civic engagement is influenced by several contextual factors. Digital literacy, regular access to online information, and opportunities for technology-based communication were identified as factors that enhance civic engagement among students. Conversely, infrastructural challenges such as poor internet connectivity, unstable electricity supply, and the high cost of mobile data were found to constrain students' ability to effectively utilize digital technologies for sustained participation in civic activities. In addition, the role of lecturers emerged as an important factor, as students exposed to regular ICT-supported instruction demonstrated greater confidence in applying digital technologies beyond academic purposes.

In conclusion, the study confirms that ICT integration among Technology Education students should not be viewed solely as a means of improving technical competence or academic performance. Rather, sustained interaction with digital technologies also contributes to shaping students' civic awareness, communication behaviour, and participation in broader societal activities. The study, therefore, establishes that effective ICT integration within Technology Education programmes has wider implications for preparing technologically competent students who are not only skilled in the use of digital tools but are also better positioned to participate actively and responsibly in society.

Recommendations

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

1. Technology Education lecturers in universities, colleges of education, and polytechnics should increase the regular integration of ICT tools into classroom instruction and learning activities. Since the study found a strong positive relationship between ICT integration and civic engagement, increased student exposure to technology-supported learning environments will further strengthen students' digital interaction and participation in socially relevant activities.
2. Institutional administrators and school management should provide adequate ICT facilities and create enabling digital learning environments for Technology Education students. The study established that ICT integration significantly influences civic engagement; therefore, improving access to computers, internet-enabled devices, and digital learning platforms will enhance students' opportunities for both academic learning and broader social participation.

3. Government agencies and educational institutions should address infrastructural challenges affecting effective ICT utilization by improving internet connectivity, stable electricity supply, and affordable access to digital services within tertiary institutions. The findings revealed that poor infrastructure and high cost of internet access remain major factors constraining students from fully utilizing ICT for continuous engagement beyond classroom activities.
4. Lecturers and instructors handling Technology Education courses should continuously improve their digital competence through regular professional development programmes and ICT capacity-building workshops. The study found that lecturers play a major role in shaping students' confidence in the use of digital technologies, making lecturer competence an important factor in strengthening students' effective ICT engagement.
5. Technology Education students should be encouraged by institutions to engage more actively with digital platforms for information seeking, communication, collaboration, and participation in socially relevant discussions. Since the study revealed that digital literacy and online communication opportunities enhance civic engagement, encouraging responsible and productive use of digital technologies can improve students' awareness of societal issues and strengthen their participation in community-related activities.

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