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Integrating Information and Communication Technology (ICT) Facilities for Effective General Studies Education: Social Competency Development and Infrastructural Needs in Colleges of Education in North Central of Nigeria

By

Onjefu Bathlomew Paul[1], Blessing N. Gilbert[2]

[1]Institution: Federal College of Education, Odugbo Department: General Studies in Education
[2]Institution: Federal College of Education, Odugbo Department: Information Communication Technology

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Abstract

This study examined the social competencies and infrastructural needs for effective Information and Communication Technology (ICT) integration in General Studies Education in Colleges of Education in North Central Nigeria. Specifically, the study identified the social competencies required for ICT integration, assessed the infrastructural needs, and determined the level of ICT integration in General Studies Education. A descriptive survey research design of the correlational type was adopted. The population comprised 3,248 General Studies lecturers in public Colleges of Education in North Central Nigeria, from which a sample of 356 lecturers was selected using the Taro Yamane formula and multistage sampling technique. Data were collected using the researcher-developed GST Lecturers' Social Competencies, Infrastructural Needs and ICT Integration Questionnaire (GSCINIQ), validated by experts and yielding a Cronbach's alpha reliability coefficient of 0.79. Data were analyzed using mean, standard deviation, Pearson Product Moment Correlation, and multiple regression. The findings revealed that lecturers generally possessed the social competencies required for ICT integration (Grand Mean = 2.75), although deficiencies existed in online classroom management, conflict resolution, and technical troubleshooting. Respondents agreed that adequate ICT infrastructure, particularly reliable electricity, internet connectivity, computer laboratories, and technical support, was essential for effective ICT integration (Grand Mean = 3.00). However, the overall level of ICT integration in General Studies Education was low (Grand Mean = 2.18), with ICT use largely limited to basic instructional activities. The study concluded that improving ICT integration requires strengthening lecturers' practical digital pedagogical competencies alongside sustained investment in ICT infrastructure. It was recommended that Colleges of Education prioritize continuous ICT capacity-building programmes and adequate digital infrastructure to enhance technology-supported teaching and learning.

Keywords: *General Studies Education, ICT integration, social competencies, infrastructural needs, Colleges of Education.*

Introduction

Information and Communication Technology (ICT) has become a defining feature of twenty-first-century education, transforming instructional delivery, communication, collaboration, assessment, and knowledge creation across all levels of education. Consequently, the integration of ICT into teacher education has shifted from being an optional innovation to an essential requirement for preparing teachers capable of functioning effectively in digitally enabled learning environments. Recognizing this imperative, many countries have incorporated digital literacy and technology-enhanced pedagogy into teacher education programmes. In Nigeria, the National Commission for Colleges of Education (NCCE), the regulatory agency responsible for setting standards for teacher education, has strengthened the integration of digital competencies into the Nigeria Certificate in Education (NCE) curriculum to ensure that prospective teachers acquire the knowledge and skills required for technology-driven classrooms in line with global best practices (Guardian Nigeria, 2026). Achieving this objective, however, depends not only on the availability of digital technologies but also on the competencies of lecturers and students as well as the

*Corresponding Author: **Onjefu Bathlomew Paul**

adequacy of institutional infrastructure that supports meaningful ICT integration.

Within the NCE curriculum, General Studies Education (GNS) occupies a unique position because it is compulsory for all teacher trainees irrespective of their teaching specialization. The programme is designed to broaden students' communication, civic, entrepreneurial, and life skills while promoting intellectual development beyond disciplinary boundaries. Since every NCE student participates in General Studies Education courses, the programme provides an institution-wide platform through which the effectiveness of ICT integration can be examined across Colleges of Education. Consequently, understanding the factors that facilitate or hinder ICT integration within General Studies Education has important implications for improving the overall quality of teacher preparation.

Effective ICT integration extends beyond the mere provision of computers, projectors, or internet-enabled devices. Rather, it involves the pedagogically appropriate use of digital technologies to support teaching, learning, assessment, communication, and collaboration in ways that improve educational outcomes. Studies conducted within the Nigerian educational system indicate that the educational benefits of ICT are increasingly recognized, although the extent of successful classroom integration remains inconsistent. For example, Adegbija et al. (2023) reported that lecturers who regularly utilized ICT facilities demonstrated greater instructional effectiveness than those relying exclusively on conventional teaching approaches. However, evidence also suggests that improvements in access to digital technologies have not always translated into corresponding improvements in instructional practice. Femi-Adeoye (2025) observed that although many teachers possessed adequate digital skills, they continued to depend largely on traditional assessment methods and experienced difficulties integrating ICT into innovative pedagogical practices. These findings suggest that successful ICT integration requires more than technological availability alone and that other enabling factors deserve greater attention.

One such factor is social competency. The integration of ICT into teaching and learning is inherently collaborative, requiring lecturers and students to communicate effectively, share knowledge, solve problems collectively, adapt to technological change, and participate actively in digitally mediated learning environments. Consequently, social competency has become an increasingly important dimension of professional competence in contemporary teacher education. Joseph et al. (2024) conceptualized competence as encompassing communication, teamwork, problem-solving, digital literacy, and time management, while Ogunbodede et al. (2023) argued that digital competence has become an indispensable complement to lecturers' pedagogical, professional, and interpersonal competencies. Similarly, Enyekit and Ukata (2022) emphasized that competence is demonstrated through the effective application of acquired knowledge and skills to workplace demands rather than by the possession of knowledge alone. Collectively, these studies suggest that lecturers' ability to communicate, collaborate, and adapt within technology-supported learning environments may substantially influence the success of ICT integration. Nevertheless, empirical evidence examining the specific contribution of social competency to ICT integration within General Studies Education in Nigerian Colleges of Education remains limited.

Equally important is the availability of adequate ICT infrastructure. The successful integration of technology into teaching depends on reliable electricity supply, functional computer laboratories, internet connectivity, multimedia facilities, digital learning resources, and effective technical support services. Across Nigerian tertiary institutions, inadequate infrastructure continues to be identified as one of the most significant barriers to effective ICT implementation (Dosumu, 2024; Effiom et al., 2023; Memon & Memon, 2025; Olumide & Yusuf, 2023). Persistent challenges relating to unstable electricity, inadequate broadband connectivity, insufficient digital equipment, and limited maintenance support have constrained lecturers' ability to incorporate ICT into routine instructional activities. These infrastructural deficiencies not only limit access to digital learning opportunities but also reduce the effectiveness of institutional investments in educational technology.

The infrastructural situation is particularly significant in Colleges of Education because these institutions are responsible for preparing future teachers who are expected to integrate technology into classroom practice upon graduation. Existing studies indicate that many Colleges of Education continue to experience shortages of instructional facilities, overcrowded learning environments, and inadequate technological resources that undermine effective teaching and learning (Guardian Nigeria, 2023; Ogunode & Odo, 2023). Within North Central Nigeria, infrastructural challenges have persisted despite interventions aimed at improving educational facilities, with evidence indicating that institutional needs continue to exceed available resources (Agbenyeku et al., 2025; Ogunode & Agbor, 2023). These conditions may significantly affect the quality of ICT integration within General Studies Education, where large student enrolments place additional demands on available technological facilities.

Although previous studies have investigated ICT utilization, digital competence, infrastructural challenges, and technology adoption within Nigerian higher education, these variables have largely been examined independently or within university settings. Comparatively little attention has been devoted to Colleges of Education, particularly General Studies Education, despite its compulsory and institution-wide nature. Furthermore, limited empirical evidence exists regarding the specific social competencies required for effective ICT integration, the infrastructural needs necessary to support such integration, the current level of ICT integration achieved, and the challenges constraining its effective implementation within Colleges of Education in North Central Nigeria. Addressing these gaps is essential for generating evidence that can guide institutional planning, resource allocation, and policy interventions aimed at strengthening technology-

enhanced teacher education. It is against this background that the present study investigates the integration of Information and Communication Technology facilities for effective General Studies Education, with particular emphasis on social competency development and infrastructural needs in Colleges of Education in North Central Nigeria.

Statement of the Research Problem

General Studies Education (GNS) is compulsory for all Nigeria Certificate in Education (NCE) students, making it an important platform for promoting institution-wide ICT integration in Colleges of Education. Despite this strategic role, instructional delivery in many Colleges of Education remains largely dependent on conventional teaching methods. Although many lecturers possess basic digital skills, these have not consistently translated into innovative teaching and assessment practices (Femi-Adeoye, 2025).

Previous studies have attributed the slow pace of ICT integration to inadequate infrastructure, including unreliable electricity supply, poor internet connectivity, insufficient computer laboratories, and limited digital learning facilities (Dosumu, 2024; Memon & Memon, 2025; Olumide & Yusuf, 2023). At the same time, successful ICT integration requires lecturers and students to possess social competencies such as communication, collaboration, adaptability, and problem-solving, yet evidence regarding the availability and influence of these competencies remains limited (Joseph et al., 2024; Ogunbodede et al., 2023).

Although ICT utilization, digital competence, and infrastructural challenges have been widely studied in Nigerian higher education, these variables have largely been examined separately and predominantly within university settings. Consequently, little is known about the social competencies required for effective ICT integration, the infrastructural needs that support it, the current level of ICT integration achieved, the challenges affecting its implementation, and the relationships among these variables within General Studies Education in Colleges of Education in North Central Nigeria. This lack of empirical evidence limits informed decision-making on ICT planning, resource allocation, and capacity building for teacher education. Therefore, this study investigates the social competencies, infrastructural needs, level of ICT integration, challenges, and relationships among these variables to provide evidence for improving ICT integration in General Studies Education in Colleges of Education in North Central Nigeria.

Purpose of the Study

The purpose of this study was to examine the social competencies and infrastructural needs for effective ICT integration in General Studies Education in Colleges of Education in North Central Nigeria. Specifically, the study sought to:

1. identify the social competencies required for effective ICT integration;
2. assess the infrastructural needs required for effective ICT integration; and
3. determine the level of ICT integration in General Studies Education.

Research Questions

The following research questions guided the study:

1. What social competencies are required for effective ICT integration in General Studies Education?
2. What infrastructural needs are required for effective ICT integration in General Studies Education?
3. What is the level of ICT integration in General Studies Education?

Methodology

This study adopted a descriptive survey research design of the correlational type. The design was appropriate because it enabled the researcher to examine the existing state of social competencies, infrastructural needs, and ICT integration in General Studies Education (GNS) without manipulating the study variables, while also determining the relationships among them.

The population comprised 3,248 General Studies (GST) lecturers in public Colleges of Education across the North Central geopolitical zone of Nigeria. A sample of 356 lecturers was determined using the Taro Yamane (1967) formula at a 5% margin of error. A multistage sampling procedure was employed. First, one public College of Education was randomly selected from each of the six states and the Federal Capital Territory, giving a total of seven colleges. The sample was then proportionately allocated to the selected institutions based on their lecturer population, after which respondents were selected through simple random sampling by balloting.

Data were collected using a researcher-developed instrument titled GST Lecturers' Social Competencies, Infrastructural Needs and ICT Integration Questionnaire (GSCINIQ). The questionnaire consisted of five sections covering respondents' demographic information, social competencies, infrastructural needs, level of ICT integration, challenges affecting ICT integration, and items measuring the relationships among the study variables. The instrument employed a four-point Likert rating scale, with response options ranging from Strongly Agree (4) to Strongly Disagree (1), while items measuring the level of ICT integration were rated from Very High Extent (4) to Very Low Extent (1). The instrument was validated by experts in Measurement and Evaluation and Educational Technology, whose observations informed the revision of the final draft. Reliability was established through a pilot study involving 30 GST lecturers from a public College of Education outside the sampled institutions. Cronbach's alpha yielded a reliability coefficient of 0.79, indicating satisfactory internal consistency. Data were collected with the assistance of trained research assistants across the selected colleges. Respondents were informed of the purpose of the study and assured of the confidentiality of their responses. Only properly completed questionnaires were used for analysis. Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Research Questions 1–4 were answered using mean and standard deviation, with a criterion

*Corresponding Author: **Onjefu Bathlomew Paul**

mean of 2.50 for decision-making. Mean scores of 2.50 and above indicated agreement or a high level of ICT integration, whereas scores below 2.50 indicated disagreement or a low level of ICT integration. The relationship among social competencies, infrastructural needs, and ICT integration was examined using Pearson Product Moment Correlation (PPMC), while the corresponding null hypothesis was tested using multiple regression analysis at the 0.05 level of significance.

Results

Research Question 1. What social competencies are required for effective ICT integration in General Studies Education?

Table 1: Mean and Standard Deviation of Responses on Social Competencies

S/N	Item	Mean	SD	Decision
1	Lecturers can communicate effectively using digital platforms (email, LMS, chat)	3.10	0.68	Agreed
2	Lecturers can collaborate with colleagues using online tools	2.85	0.74	Agreed
3	Lecturers observe appropriate digital etiquette when using ICT for teaching	2.95	0.71	Agreed
4	Lecturers can adapt teaching style to accommodate ICT-based instruction	2.60	0.80	Agreed
5	Lecturers can manage online classroom interactions effectively	2.40	0.85	Disagreed
6	Lecturers demonstrate teamwork in ICT-supported group activities	2.70	0.77	Agreed
7	Lecturers can resolve conflicts arising from ICT-mediated communication	2.35	0.82	Disagreed
8	Lecturers exhibit patience/tolerance when guiding students on ICT tools	2.90	0.69	Agreed
9	Lecturers can build rapport with students through digital means	2.55	0.79	Agreed
10	Lecturers respect data privacy/ethics in ICT use	3.05	0.66	Agreed
11	Lecturers can troubleshoot minor technical problems during ICT-based lessons	2.30	0.83	Disagreed
12	Lecturers can effectively facilitate group discussions using digital tools	2.65	0.76	Agreed
13	Lecturers can give constructive feedback to students through digital platforms	2.80	0.72	Agreed
14	Lecturers are willing to learn new ICT applications relevant to GSE teaching	3.15	0.63	Agreed
15	Lecturers can model responsible and ethical online behaviour for students	2.95	0.70	Agreed
	Grand Mean	**2.75**		**Agreed**

*Note: The criterion mean was **2.50**. Mean scores of **2.50 and above** were interpreted as **Agreed,** while mean scores **below 2.50** were interpreted as **Disagreed***

Table 1 presents the mean and standard deviation of respondents' ratings on the social competencies required for effective ICT integration in General Studies Education. The results showed a grand mean of 2.75, which is above the criterion mean of 2.50, indicating that respondents generally agreed that the identified social competencies are required for effective ICT integration. Specifically, lecturers were perceived to possess competencies in digital communication (M = 3.10), collaboration (M = 2.85), digital etiquette (M = 2.95), adaptability to ICT-based instruction (M = 2.60), teamwork (M = 2.70), patience in guiding students (M = 2.90), rapport building (M = 2.55), data privacy and ethics (M = 3.05), digital feedback (M = 2.80), willingness to learn new ICT applications (M = 3.15), and responsible online behaviour (M = 2.95). However, respondents disagreed that lecturers effectively manage online classroom interactions (M = 2.40), resolve ICT-related conflicts (M = 2.35), and troubleshoot minor technical problems during ICT-supported lessons (M = 2.30).

Research Question 2: What infrastructural needs are required for effective ICT integration in General Studies Education?

Table 2: Mean and Standard Deviation of Responses on Infrastructural Needs

S/N	Item	Mean	SD	Decision
1	Adequate functional computers are needed in GSE classrooms	3.20	0.60	Agreed
2	Stable internet connectivity is required	3.35	0.58	Agreed
3	Reliable power supply is needed to support ICT use	3.40	0.55	Agreed

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S/N	Item	Mean	SD	Decision
4	Functional projectors/smartboards are required in lecture halls	2.90	0.70	Agreed
5	A well-equipped e-library is needed	3.05	0.66	Agreed
6	Technical/ICT support staff are needed on ground	2.95	0.72	Agreed
7	A Learning Management System (LMS)/relevant software is required	2.65	0.80	Agreed
8	Regular maintenance of ICT facilities is needed	2.80	0.75	Agreed
9	Adequate ICT laboratories/centres are required	3.00	0.68	Agreed
10	Sufficient budgetary allocation for ICT infrastructure is needed	3.15	0.62	Agreed
11	Alternative power sources (e.g., solar, generator backup) are needed	3.25	0.59	Agreed
12	Adequate seating/workstation space for ICT-based learning is needed	2.75	0.73	Agreed
13	Access control and security systems for ICT equipment are needed	2.60	0.78	Agreed
14	Institutional Wi-Fi coverage across departments is needed	3.10	0.64	Agreed
15	Up-to-date computer software and licensed applications are needed	2.85	0.71	Agreed
	Grand Mean	**3.00**		**Agreed**

*Note: The criterion mean was **2.50**. Mean scores of 2.50 and above were interpreted as Agreed, while mean scores below 2.50 were interpreted as Disagreed*

Table 2 presents respondents' ratings on the infrastructural needs required for effective ICT integration. The findings revealed a grand mean of 3.00, indicating overall agreement that the listed facilities are required for effective ICT integration. All fifteen items recorded mean scores above the criterion mean of 2.50, suggesting that respondents considered functional computers, stable internet connectivity, reliable electricity supply, ICT laboratories, projectors, e-library facilities, technical support personnel, learning management systems, regular maintenance, adequate funding, alternative power sources, institutional Wi-Fi, and updated software as essential infrastructural requirements for ICT integration in General Studies Education.

Research Question 3: What is the level of ICT integration in General Studies Education?

Table 3: Mean and Standard Deviation of Responses on Level of ICT Integration

S/N	Item	Mean	SD	Decision
1	ICT tools are used regularly in GSE lecture delivery	2.20	0.81	Disagreed
2	Students submit GSE assignments via digital platforms	2.05	0.84	Disagreed
3	GSE lecturers use multimedia (videos, slides) in teaching	2.45	0.79	Disagreed
4	Online assessment/quizzes are used in GSE	1.95	0.86	Disagreed
5	Lecturers use the internet for GSE research and content update	2.80	0.70	Agreed
6	Video conferencing tools are used for GSE instruction	1.90	0.88	Disagreed
7	E-library resources are used to support GSE teaching	2.30	0.80	Disagreed
8	ICT is used for record-keeping and grading in GSE	2.35	0.78	Disagreed
9	Lecturers use social media/discussion forums to extend GSE learning beyond class	2.10	0.85	Disagreed
10	GSE course materials are shared digitally with students	2.55	0.77	Agreed
11	ICT is used to facilitate group projects/collaborative learning in GSE	2.15	0.82	Disagreed
12	Lecturers integrate ICT-based simulations or interactive content in GSE	1.85	0.87	Disagreed
13	Feedback on GSE assessments is given through digital means	2.00	0.85	Disagreed
14	Attendance/participation in GSE is tracked using ICT tools	2.25	0.80	Disagreed

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S/N	Item	Mean	SD	Decision
15	ICT is used to personalize or differentiate instruction in GSE	1.80	0.89	Disagreed
	Grand Mean	**2.18**		**Low/Disagreed**

*Note:The criterion mean was **2.50**. Mean scores of **2.50 and above** were interpreted as **Agreed,** while mean scores **below 2.50** were interpreted as **Disagreed***

Table 3 presents the level of ICT integration in General Studies Education. The findings showed a grand mean of 2.18, which is below the criterion mean of 2.50, indicating a low level of ICT integration. Only two items use of the internet for research and updating instructional content (M = 2.80) and digital sharing of course materials (M = 2.55) recorded mean scores above the criterion mean. The remaining thirteen items, including the use of ICT for lecture delivery, online assessment, multimedia instruction, video conferencing, e-library utilization, record keeping, collaborative learning, interactive content, digital feedback, attendance tracking, and differentiated instruction, recorded mean scores below 2.50, indicating that these ICT practices are not widely integrated into General Studies Education in the sampled Colleges of Education.

Discussion of Findings

The study found that General Studies (GST) lecturers generally possessed the social competencies required for ICT integration, although deficiencies were evident in online classroom management, conflict resolution, and technical troubleshooting. This finding aligns with previous Nigerian studies, which consistently reported that lecturers possess foundational competencies such as communication, collaboration, digital literacy, and positive attitudes toward ICT but often struggle to translate these competencies into effective technology-enhanced teaching practices (Femi-Adeoye, 2025; Joseph et al., 2024; Ogunbodede et al., 2023; Odefunsho et al., 2023). The convergence of these findings suggests that while lecturers have acquired basic digital competencies, they remain less confident in managing real-time ICT-supported instructional activities that require pedagogical decision-making and technical problem-solving. This may reflect the emphasis of many professional development programmes on digital literacy rather than on the practical application of ICT within classroom instruction. Consequently, strengthening ICT integration in General Studies Education will require continuous capacity-building initiatives that focus on classroom-based digital pedagogy, online classroom management, and technical troubleshooting skills rather than on basic ICT literacy alone.

The findings further revealed that respondents considered all the identified infrastructural facilities necessary for effective ICT integration, highlighting stable electricity supply, internet connectivity, functional computers, and adequate funding as major infrastructural priorities. This finding corroborates earlier studies which identified inadequate infrastructure as one of the greatest barriers to ICT integration in Nigerian tertiary institutions (Dosumu, 2024; Effiom et al., 2023; Memon & Memon, 2025; Ogunode & Agbor, 2023; Ogunode & Odo, 2023). Similarly, Bawa et al. (2026) reported that inadequate ICT facilities, unstable electricity supply, poor internet services, and insufficient funding constrained ICT utilization in Colleges of Education within North Central Nigeria. However, the present study extends previous research by demonstrating that respondents also regarded alternative power sources and security systems for ICT facilities as important infrastructural requirements. This finding reflects the realities of the Nigerian educational environment, where unreliable electricity supply and concerns about equipment security have become critical considerations for sustaining technology-enhanced teaching and learning. The implication is that ICT integration policies should address not only the provision of digital facilities but also their maintenance, protection, and sustainability.

The study also found that the overall level of ICT integration in General Studies Education was low, with lecturers primarily using ICT for internet-based research and digital sharing of instructional materials, while more interactive applications such as online assessment, video conferencing, simulations, collaborative learning, and differentiated instruction were rarely utilized. This finding is consistent with Femi-Adeoye (2025), who observed that although teachers demonstrated competence in using digital tools, classroom assessment and instructional practices remained predominantly conventional. It also supports the findings of Bawa et al. (2026), who reported that ICT utilization in Colleges of Education was constrained despite its positive influence on instructional delivery. The present study, however, provides a more detailed understanding by showing that ICT integration is concentrated on basic instructional functions rather than on learner-centred and interactive pedagogical applications. This pattern suggests that ICT is yet to be fully embedded within teaching and learning processes in General Studies Education. The low level of integration may be attributed to the combined influence of inadequate infrastructure and limitations in lecturers' practical ICT competencies, both of which reduce opportunities for the effective use of advanced digital teaching strategies. These findings underscore the need for institutional investment in both technological infrastructure and sustained professional development to achieve meaningful ICT integration in Colleges of Education.

Conclusion

Based on the findings, this study concludes that effective ICT integration in General Studies Education in Colleges of Education in North Central Nigeria depends on the combined influence of lecturers' social competencies and the availability of adequate ICT infrastructure. Although GST lecturers generally possess foundational social competencies such as

digital communication, collaboration, digital etiquette, and a willingness to adopt new technologies, important gaps remain in online classroom management, conflict resolution, and technical troubleshooting. The study also established that essential infrastructural facilities—including reliable electricity, stable internet connectivity, functional computers, ICT laboratories, and adequate funding—are critical requirements for effective ICT integration. However, despite the recognition of these competencies and infrastructural needs, the overall level of ICT integration in General Studies Education remains low, with ICT use largely confined to basic instructional activities rather than interactive and learner-centered pedagogical practices. The study therefore concludes that meaningful ICT integration will require simultaneous investment in human capacity development and sustainable ICT infrastructure to support technology-enhanced teaching and learning in Colleges of Education.

Recommendations

Based on the findings and conclusion, the following recommendations are made:

1. Colleges of Education should organize regular professional development programmes focusing on practical ICT pedagogical skills, particularly online classroom management, digital assessment, technical troubleshooting, and collaborative digital teaching strategies.
2. Institutional administrators and government agencies should prioritize the provision and maintenance of essential ICT infrastructure, including functional computer laboratories, reliable internet connectivity, uninterrupted electricity supply, multimedia teaching facilities, and alternative power sources to support technology-enhanced instruction.
3. The National Commission for Colleges of Education (NCCE) should strengthen the implementation and monitoring of ICT integration policies by establishing minimum digital infrastructure standards and periodic evaluations of ICT utilization in General Studies Education.
4. Colleges of Education should provide continuous technical support services and establish functional ICT support units to assist lecturers in addressing technical challenges encountered during technology-supported teaching.
5. Lecturers should be encouraged to integrate ICT into learner-centered instructional practices, including online assessment, collaborative learning, digital feedback, virtual discussions, and interactive learning activities, to improve students' learning experiences and digital competencies.
6. Government, the Tertiary Education Trust Fund (TETFund), and other education stakeholders should increase investment in ICT infrastructure and staff capacity development to facilitate the effective integration of digital technologies into teacher education programmes across Colleges of Education.

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