



The Role of Information and Communication Technology (ICT) Tools in Enhancing Teaching and Learning in Colleges of Education: A Strategic Approach towards Improving Graduate Employability

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Abstract

The study ascertained the role of information and communication technology (ICT) in enhancing teaching and learning in colleges of education. Descriptive survey research design was adopted for the study. The population for the study consisted of 1,200 teachers drawn from Colleges of Education, Eha-Amufu and Enugu State College of Education (Technical). From the population, 5% was drawn which gives a sample size of 125. A questionnaire titled “The Role of ICT Tools on Teaching, Learning, and Improving Employability (RICTLIE) Questionnaire was used for data collection. The questionnaire contained 42 items, which were divided into four sections. The instrument was validated by three experts. The data collected were analysed using percentage, mean and standard deviation. The study revealed that some ICT tools are not accessible in Colleges of Education in Enugu State. In addition, the study further revealed that the Accessible ICT tools in the Colleges of Education are not adequate and sufficiently utilized in teaching and learning. The study also revealed poor funding, unstable electricity supply, and time constraints in using ICT in teaching and learning among others as problems affecting effective application of ICT tools in teaching and learning in the Colleges of Education surveyed. Based on these findings, the study recommends among others that the government should equip Colleges of Education with adequate ICT facilities for effective teaching and learning as well as organize ICT training workshops for teachers in Nigerian Colleges of education.

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Background of the study

The integration of Information and Communication Technology (ICT) in education has become increasingly vital in enhancing the teaching and learning process, particularly in colleges of education. As the world becomes more digitized, the ability to effectively utilize ICT tools is essential for both educators and students. ICT is all about records management, communication enhancement and retrieval of information in an organization using advanced technology such as the computer and other telecommunication and electronic devices (Igbino, 2015). These technologies facilitate a more dynamic and interactive learning environment, enhancing both teaching efficacy and student learning outcomes (Bates, 2019).

Technologies which have been found to enhance the teaching and learning outcome include computers, interactive whiteboards, laptops, smartphones, internet, projectors, tablets, among others (Igbino, 2015). This era is the time for upskilling and producing workforce that is capable of effectively dealing with the day-by-day increasing demand of the industry (Rameen et al 2020). The job market for graduates is becoming increasingly competitive. To meet the demands of the modern workforce, graduates must possess not only foundational knowledge but dynamic skills in cutting-edge technologies such as artificial intelligence, machine learning, blockchain, and cloud computing. Cutting-edge technology refers to the most advanced and innovative technological developments that are at the forefront of their respective fields, often characterized by groundbreaking advancements and significant improvements over existing technologies (Schilling, 2017). These are the newest, most advanced, and innovative developments in technology, which typically offer significant improvements over existing technologies and hold the potential to transform industries and society (Laudon et al; 2020). The availability of ICT tools for education varies widely, encompassing both free and paid options, as well as different levels of access depending on the specific tool and its deployment. In most of these colleges of education, the accessibility of these technologies

has not been ascertained and the application of ICT tools for teaching and learning becomes worrisome.

ICT application in teaching and learning is becoming glaringly vital owing to its effect in acquisition of knowledge and skills. ICT has the potential to support education across the curriculum and provides opportunities for effective communication between teachers and students (Dawes, 2018). ICT also provides quicker and easier access to more extensive and current information. This integration not only improves educational experiences but also enhances graduate employability competency by equipping students with necessary digital skills.

Employability competency refers to a set of achievements – skills, understandings and personal attributes that makes graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy (Yorke, 2016). Disciplinary knowledge, transferable generic skills, emotional regulation, career development skills, self-management, and self-efficacy were the employability competences identified by (Römgen et al., 2020). Ultimately, development of the capacity to acquire and constantly update these employability competences should result in employable graduates who are well prepared to make the transition from higher education to the labor market (Donald et al., 2019).

Employability competencies are essential attributes and skills that enhance an individual's ability to secure and sustain employment. These competencies transcend technical skills, focusing on transferable and adaptable qualities that meet the demands of dynamic work environments. Herbert et al. (2020) stated that an employee's employability potential is delivered by the competence in delivering a task is accompanied by certain behavioral dispositions and skills. Yorke (2006) defines employability as a set of achievements—skills, understandings, and personal attributes—that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community, and the economy. York's model highlights Digital literacy,

problem solving as parts of Essential Competencies for Employability.

Digital literacy is foundational for career readiness in technology-driven industries (Partnership for 21st Century Learning, 2015). Digital literacy refers to the ability to effectively and critically navigate, evaluate, and create information using digital technologies. It encompasses skills such as accessing and managing information, communicating and collaborating through digital platforms, understanding digital content, and applying digital tools to solve problems (UNHCR, 2023; USAID, 2023). Digital literacy enables individuals to engage meaningfully in the digital economy, fosters critical thinking, and helps mitigate risks such as misinformation and cybersecurity threats (IEEE, 2023).

Problem-solving skills is another employability competency that plays a vital role in employability capacity of an individual. It refers to the ability to identify, analyze, and resolve issues effectively. It requires critical thinking, creativity, and decision-making. Yorke (2006) highlights problem-solving as a core "generic skill," pivotal for adaptability and innovation in complex professional scenarios.

Employability competences are neither innate nor easy to acquire. Hence, college of education curricula needs to adopt specific instructional approaches to develop students' employability competences to suit job market requirements by adoption of ICT as their teaching tools. Colleges of education, also, need to align their curricula with industry requirements for employment by integrating ICT tools and innovative pedagogies. Embedding ICT in teaching strategies equips students with transferable skills, bridging the gap between education and the labor market demands (Mesquita et al., 2023; OECD, 2023). In the contemporary job market, proficiency in ICT skills or which can also be termed cutting edge skill has high impact for securing employment, particularly in tech-driven industries and possibly address the issue of unemployment. These skills enable individuals to stay competitive, meet industry demands, and contribute to innovation within their fields (Schilling, 2017). Employers at this era are increasingly seeking candidates with skills in

cutting-edge technologies such as artificial intelligence, machine learning, and blockchain, as these skills are essential for driving innovation and maintaining competitive advantage (Schilling, 2017). The rapid pace of technological change also means that industries are constantly evolving, and having up-to-date skills in cutting-edge technologies as a graduate of colleges of education ensures that professionals can meet the current and future needs of employers (Laudon et al., 2020).

Cutting-edge technology skills are essential for securing employment in today's competitive job market. These skills not only increase employability but also ensure that professionals can meet industry demands, advance their careers, and maintain job security. As technology continues to evolve, the importance of staying updated with the latest advancements cannot be overstated. By dynamic skill development, we refer to a proactive approach that goes beyond traditional curriculum frameworks, incorporating emerging trends, tools, and methodologies into the learning process (Schwab, 2016).

However, while traditional college of education programs provide a foundational understanding of core concepts, they often struggle to keep pace with the rapid advancements in technology (KPMG, 2021). As a result, graduates of may find themselves lacking the cutting edge skills and knowledge required by industry leaders, leading to a gap between educational attainment and market demands. Okolie et al. (2019) emphasize the need for practical skill development to effectively prepare students for the rapidly evolving job market.

Colleges of Education is one of the tripods of tertiary education in Nigeria, that has the primary role of training teachers who will be awarded the minimum teaching qualification of Nigerian Certificate of Education (NCE) (Onifade & Onifade, 2011). College of education is an institution which aims at equipping teachers with desirable attitude, skills and knowledge so as to make them effective and efficient in their work in accordance with the needs of the society at any point in time (Ibidapo-Obe (2007). Modern employers seek

graduates of college of education who are proficient in digital tools and technologies. The skills required in today's job market extend beyond academic knowledge to include digital literacy, problem-solving, critical thinking, and collaboration in virtual environments.

However, significant gaps exist in the readiness and application of ICT in Colleges of Education. The European Commission's Digital Economy and Society Index (DESI) reported that a significant percentage of graduates do not possess the advanced digital skills required by employers (European Commission, 2019). World Economic Forum (2020) pointed out that digital skills are among the top skills demanded by employers, yet many graduates are underprepared in this area. There is also inadequate provision of technological equipment and laboratory facilities to impart adequately on students' knowledge on ICT in enhancing learning and development of Education in Nigeria (Oyedeki, et al, 2018). The majority of teachers in colleges of education still find it difficult to use e-learning, while to some, it is still a dream because of poor and weak technological infrastructure (Anene and Odumuh, 2014; Dubé et al., 2017).

Moreover, research has shown that ICT creates impact in job market. Possessing ICT skill in advanced technologies can lead to greater job security and opportunities for career advancement and employability, as these skills are in high demand and less susceptible to automation (Hitt, et al., 2016). This study therefore aims to close the highlighted gap by ascertaining the role of Information and Communication Technology (ICT) tools in enhancing teaching and learning in Colleges of Education as a strategic approach towards improving graduate employability. This will be done by finding out the readiness of ICT tools in colleges of education, extents of its application and its impact in enhancing employability of graduate of the institution.

Research Questions

1. To what extent are ICT tools readily accessible in Colleges of Education in Enugu State to enhance teaching and learning as a strategic approach towards Improving Graduate Employability?

2. To what extent are ICT tools applied in Colleges of Education in Enugu State to enhance teaching and learning as a strategic approach towards Improving Graduate Employability?
3. What are the impacts of ICT knowledge on graduates of colleges of education in Enugu State?

Methodology

Descriptive survey research design was used to carry out this research. The survey targeted two public Colleges of Education in Enugu State which are Federal College of Education, Eha-Amufu and Enugu State College of Education (Technical). The choice of these colleges of education is because the study targeted only public colleges of education in the state. The population of the study was made up of 2,500 respondents from two Colleges of Education in Enugu State. A simple random sampling technique was used to get the sample population of 125 pre-service and in-service teachers. The choice of this technique is to ensure that every individual in the population has an equal chance of being selected, minimizing selection bias. The relevant data for this study was collected using a questionnaire developed by the researcher with the titled "The Role of ICT Tools on Teaching, Learning, and Improving Employability (RICTTLE) Questionnaire. The questioner contained 28 items, which were carefully structured to elicit responses from the respondents. The questionnaire consists of two parts: A and B. Part A contained demographic information of the respondents, while part B elicits information on the extent of accessibility and application of information and communication technology (ICT) tools in teaching and learning in Colleges of Education in Enugu State, from the respondents. The instrument for data collection for this study was validated by three experts from Computer Education Unit, Department of Vocation Teacher Education, University of Nigeria, Nsukka. The experts were requested to look at the researcher's instrument so as to check its suitability for the study. Based on the suggestions and recommendations of the experts, some items were modified while some were removed. However, all the comments by

validates were carefully considered in the final draft of the questionnaire. The reliability of the instrument was also checked using Ebonyi state colleges of education in Ebonyi state. It was analysed with Crombat Alpha for internal consistency and the result showed 0.8 reliability index indicating that the questioner is reliable. The researcher used the validated and reliable instrument to collect the responses from teachers and students in Colleges of Education surveyed.

The questionnaire was distributed to the 125 sampled in-service and pre-service teachers in the Colleges of Education of the study area. The data collected for this study were analysed using frequency and percentage, mean scores and standard deviation as statistical tools. The frequency and percentage and mean were used to answer the research questions while standard deviation was used to determine the close relationship between the respondents' opinions.

Result

Table 1: Percentage, Mean Ratings and Standard Deviation of the Respondents on the Extent of Accessibility of ICT Tools in Teaching and Learning in Colleges of Education Enugu State.

| ACCESIBILITY | | | | ADEQUACY | | |
|--------------------------------------|-----|------|----------------|-------------|-------------|--------------|
| S/N Item statements | F | % | Remark | \bar{X} | SD | Remark |
| 1. Computer Laboratory | 100 | 80.0 | Accessible | 1.74 | 0.46 | Not Adequate |
| 2. Computer System | 101 | 80.8 | Accessible | 1.59 | 1.10 | Not Adequate |
| 3. Database | 101 | 81.6 | Accessible | 1.92 | 0.55 | Not Adequate |
| 4. Digital Camera | 25 | 20.0 | Not Accessible | 0.00 | 0.00 | - |
| 5. E-learning portal/platform | 22 | 17.6 | Not Accessible | 0.00 | 0.00 | - |
| 6. E-library service | 25 | 20.0 | Not Accessible | 0.00 | 0.00 | - |
| 7. Interactive white board | 100 | 80.0 | Accessible | 1.22 | 0.70 | Not Adequate |
| 8. Internet facility (LAN, wireless) | 105 | 84.0 | Accessible | 1.36 | 0.68 | Not Adequate |
| 9. Maintenance workshop | 32 | 25.6 | Not Accessible | 0.00 | 0.00 | - |
| 10. Multimedia projector | 85 | 68.0 | Accessible | 1.21 | 0.54 | Not Adequate |
| 11. Printer | 101 | 80.8 | Accessible | 1.86 | 1.18 | Not Adequate |
| 12. Scanner | 86 | 68.8 | Accessible | 1.47 | 0.89 | Not Adequate |
| GROUND MEAN | | | | 1.55 | 0.51 | Not Adequate |

Key: F = Frequency; % = Percentage; \bar{X} = Mean; SD = Standard Deviation

The data presented in Table 1 shows that items that are below 50% are not accessible while those above 50% are Accessible. Therefore, table 1 revealed that Digital Camera, E-learning portal/platform, E-library service and Maintenance workshop have their percentages below 50% ranging from 17.6% to 25.6% and therefore are not Accessible in the Colleges of Education in Enugu State. However, the other items like Computer Laboratory Computer System, Database, Interactive white board, Internet facility (LAN, wireless), Multimedia projector, Printer and Scanner have their percentage above 50% ranging from 68.0% to 84.0% and therefore are accessible in the

Colleges of Education in Enugu State. The data presented in table 1 also show that all the accessible items are not adequate in Teaching and Learning in Colleges of Education in Enugu State with the mean score ranging from 1.21 to 1.92. Based on the grand mean ($\bar{X} = 1.55$) which falls under the not adequate rule, it therefore established that those ICT tools that are Accessible in Colleges of Education are not adequate

The standard deviation on each of the items ranged from 0.00 to 1.18 implying that the respondents were similar in their opinions

Table 2: Mean Ratings and Standard Deviation of the Respondents on the Extent of application of ICT Tools in Teaching and learning in Colleges of Education in Enugu State;

| | | Mean (\bar{X}) | Std. Deviation | Remark |
|---|--|-----------------------|-------------------|-------------------|
| 1 | E-Learning platform for online learning | 1.93 | 0.72 | Low Extent |
| 2 | Smart board for instructional demonstration | 1.74 | 0.73 | Low Extent |
| 3 | Multimedia projector in classroom teaching and learning | 2.03 | 0.86 | Low Extent |
| 4 | Computer system in classroom teaching and learning | 1.95 | 0.62 | Low Extent |
| 5 | Database for keeping student and lecturer record | 2.46 | 0.93 | Low Extent |
| 6 | IT centre for computer practical classes | 1.98 | 0.78 | Low Extent |
| 7 | E-library for research purposes | 1.91 | 0.68 | Low Extent |
| 8 | Scanner for capturing of images and documents to computer | 2.04 | 0.69 | Low Extent |
| 9 | Digital camera for capturing instructional videos and pictures | 2.05 | 0.83 | Low Extent |
| | | 2.01 | 0.76 | LOW EXTENT |

Results in table 2 revealed that all the items are lowly utilized in Teaching and Learning in Colleges of Education in Enugu State with the mean score ranging from 1.91 to 2.46. Based on the grand mean ($\bar{X} = 2.01$), which falls under the low extent rules, it therefore established that

ICT application in teaching and learning in Colleges of Education in Enugu State is low. The standard deviation on each of the items ranged from 0.62 to 0.86 implying that the respondents were similar in their opinions.

Table 3: Mean Ratings and Standard Deviation of the Respondents on the impacts of ICT knowledge on graduates of college of education in Enugu State

| | | Mean (\bar{X}) | Std. Deviation | Remark |
|---|---|-----------------------|-------------------|-----------------------|
| 1 | My ICT knowledge has significantly improved my employability. | 3.65 | 0.60 | Strongly Agree |
| 2 | ICT equipping me with essential skills for the modern educational environment. | 3.47 | 0.59 | Agree |
| 3 | ICT skills have enhanced my teaching methods. | 3.37 | 0.62 | Agree |
| 4 | I feel well-prepared for the modern educational environment due to my ICT training. | 3.47 | 0.59 | Agree |
| 5 | ICT knowledge has given me a competitive edge in the job market. | 3.45 | 0.60 | Agree |
| 6 | ICT has helped in Global Workforce Integration | 3.45 | 0.60 | Strongly Agree |
| 7 | My ICT skills have contributed to my professional development. | 3.51 | 0.59 | Strongly Agree |
| | | 3.57 | 0.57 | Strongly Agree |

Results in table 3 show that items 2, 3, 4, 5 were on agree rule with mean scores ranging from 3.37 to 3.47 while all other items were on the strongly agree rule with mean scores ranging from 3.45 to 3.51. Based on the grand mean ($\bar{X} = 3.57$), the respondent strongly agreed that the item statements are the problems affecting ICT application in teaching and learning in Colleges of Education in Enugu State.

The standard deviation on each of the items ranged from 0.494 to 0.627 implying that the respondents were similar in their opinions.

Discussion of findings

The findings of the study among others revealed that most of the ICT resources are not accessible in the Colleges of Education. Even those ICT tools that are Accessible like computer laboratory, computer systems, database, interactive white boards, internet facilities, multimedia projectors, printers and scanners are not adequate. This is in agreement with Oyediji, Saliu, and Oluwolola (2018) who stated that there is inadequate provision of technological equipment and laboratory facilities to impart adequately on students' knowledge on ICT in enhancing learning and development of Education in Nigeria. The non-accessibility of ICT tools in Colleges of Education had made it impossible for lecturers to effectively utilize or implement ICT resources in teaching-learning process.

The study further showed that the extent of application of ICT resources in teaching and learning in Colleges of Education is still very low. This finding is in line with the findings of Ngwu (2014) who found out that ICT application is very low in Ehamufu College of Education. This calls for urgent attention and assistance to intensify the application of ICT in teaching and learning process in the College of Education.

The study also showed that ICT knowledge and skills possesses a very great impact in job market. This finding is in agreement with (Hitt, et al, 2016) who found out that having ICT skill in advanced technologies leads to greater job security and opportunities for career advancement and employability, as these skills are in high demand and less susceptible to automation.

Conclusion

The integration of ICT in education is no longer optional but a necessity for colleges of education aiming to produce competent and employable graduates. This study provides the insights into the effective use of ICT tools, the benefits and challenges associated with their implementation to maximize their impact on teaching, learning, and graduate employability. The integration of ICT in education is no longer optional but a necessity for colleges of education aiming to produce competent and employable graduates. The rapidly evolving job market demands graduates who are not only knowledgeable in their respective fields but also proficient in digital literacy and technological skills. As traditional teaching methods become less effective in meeting the needs of today's learners, ICT tools offer a dynamic and engaging alternative that can significantly enhance the educational experience.

The impact of ICT integration in teaching and learning as good strategy to ensure relevancy in job market are manifold. This research has shown that proficiency in ICT skills especially the cutting edge technologies makes candidates more attractive to employers. As companies seek to leverage the latest innovations, individuals with advanced technological skills are better positioned to secure employment. Professionals skilled in AI, ML, and blockchain can contribute to the development of new products, services, and processes, driving growth and efficiency.

It is my firm belief that the integration of ICT in education is critical for preparing graduates who are not only academically competent but also equipped with the skills required in the modern workplace.

Recommendation

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

Computer and other ICT gadget should be made Accessible and adequate for pre-service and in-service teachers for effective service delivery. This will enhance its application in teaching and learning thereby exposing the student on the digital literacy skill.

There should be regular ICT capacity

building workshops for pre-service and in-service teachers to educate them on the ICT cutting edge technologies which is relevant job market. This workshop will as keep the current on the latest skills required for proper job placement.

There should be periodic assessment of level of ICT implementation in teaching and learning by NCCE to ensure effective usage of ICT tools in teaching and learning as well taking a proper measure to equip the institution with needed items base on the periodic assessment.

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