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Students' Perception of the Availability and Usage of Information and Communication Technology in Teaching and Learning in Senior Secondary Schools in Kogi State, Nigeria

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Abstract

Purpose: This study aims to examine students' perceptions of the availability and usage of information and communication technology (ICT) in teaching and learning in senior secondary schools in Kogi State, Nigeria.

Research Methodology: This study adopted a descriptive survey research design. The population comprised 1,034,726 students, of whom 318 were sampled from six senior secondary schools (two from each senatorial zone) with an accessible population of 3,233, using 10% sampling as suggested by Glenn (2012). Data were collected using a self-structured questionnaire titled *Students' Perception of Availability and Usage of ICT Questionnaire (SPAUICTQ)*. The instrument was validated through face, content, and construct validity and yielded a reliability index of 0.68 using Pearson 'sproduct moment correlation. Data were analyzed using frequency counts, percentages, mean, standard deviation, and t-tests.

Results: The findings revealed that students had a positive perception of the availability of ICT tools, with female students showing higher perception levels. It also indicated moderate usage of ICT tools in teaching and learning, irrespective of location.

Conclusions: ICT tools are generally available but not optimally utilized in teaching and learning processes.

Limitations: This study was limited to selected schools in Kogi State and relied on self-reported data, which may have introduced bias.

Contributions: This study provides empirical insights into ICT integration in secondary education and offers recommendations for improving its effective usage among stakeholders.

Keywords: *Students' Perception, Information and Communication Technology (ICT), Kogi State Teaching and Learning, Secondary Schools,*

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1. Introduction

The advancement of information and communication technology (ICT) has made the world a global village, and teaching and learning may not be excluded. This is because the availability and utilization of ICT tools in educational settings have gained significant attention because of their potential to transform traditional methods of teaching (Bharti, Pomal, Ahmed, & Singh, 2024; Selwyn, 2021). However, students' perceptions of the availability and usage of ICT in teaching and learning are important for educators and policymakers to optimize its integration into every learning environment (Karanasios & Slavova, 2019).

Specifically, the rapid progress of technology has transformed the way information is accessed, processed, and disseminated, thereby influencing various aspects of society, including teaching and learning (Van Laar, Van Deursen, Van Dijk, & De Haan, 2017). In recent years, educational institutions, particularly secondary schools, have adopted information and communication technology (ICT) tools such as computers, tablets, interactive whiteboards, and online platforms to supplement traditional teaching methods (Bond, Zawacki-Richter, & Nichols, 2019).

These technologies may offer numerous benefits, including improved access to information, enhanced collaboration opportunities, personalized learning experiences, and increased student engagement (Basri, Alandejani, & Almadani, 2018). Despite the expansion of ICT in education, according to Saleem and Zahra (2017), disparities exist in terms of students' perceptions of the availability and usage of ICT in teaching and learning in Kogi State. Many factors may be attributed to this experience, such as socioeconomic status, geographical location, infrastructure, gender disparity, and institutional policies, which can significantly impact students' access to ICT resources.

However, incorporating ICT into education may help students develop critical digital literacy skills, including information literacy, media literacy, and technological proficiency, which can prepare them for future academic pursuits and career opportunities (Linjawi & Alfadda, 2018). Interestingly, ICT provides students and educators with instant access to vast amounts of information from around the world. This access enables students to conduct research, explore diverse perspectives, and deepen their understanding of various topics (Bali & Liu, 2018).

The author further defines ICT as a device that encompasses a broad range of technologies used to manage, process, transmit, and exchange information (2024). They added that this ICT includes both hardware and software components, as well as networks and telecommunications systems, that enable the creation, storage, retrieval, and dissemination of information. In addition, recent advancements in artificial intelligence (AI) and machine learning have opened up new opportunities for personalized learning. By contrast, Linjawi and Alfadda (2018) believed that traditional classroom instructions fall short of providing an immediate learning environment, faster evaluations, and increased learning engagement. Digital learning tools and technology have filled this void.

Therefore, the fundamental aspect of ICT in education is the availability of infrastructure. This may include access to computers, Internet connectivity, software applications, and other digital resources (Gil-Flores, Rodríguez-Santero, & Torres-Gordillo, 2017). Despite the widespread adoption of information and communication technology (ICT) tools in institutions of learning, including secondary schools, there remains a gap in understanding how students perceive the availability and usage of ICT in teaching and learning, especially in Kogi State (Pinto et al., 2025). Consequently, many students experience barriers such as limited access to ICT resources, inadequate training in ICT usage, and potential disparities in ICT availability across different educational zones (Kundu, 2020; Scherer, Siddiq, & Tondeur, 2019).

In addition, infrastructure limitations have contributed maximally to students' perception of the availability and usage of ICT in teaching and learning, such as unreliable internet connectivity and insufficient access to ICT devices (Adarkwah, 2021; Kundu, 2020). Other factors that may contribute to students' perception of the availability and usage of ICT in teaching and learning could be cultural and socioeconomic status, geographical location, infrastructure, gender disparity, and institutional policies, which may significantly and negatively impact students' access to ICT resources. In addition, students' attitudes towards the integration of ICT tools in the classroom, including their preferences for certain types of technology and their perceptions of the effectiveness of ICT-based instructional methods compared to traditional approaches, may negatively influence their perception of the availability and usage of ICT.

Furthermore, inadequate availability of ICT facilities to secondary school students, difficulty faced by students in using ICT, and accessibility of ICT resources by students may negatively affect their perception of ICT availability and usage. Moreover, ICT tools for teaching and learning, differences

among students who use ICT and those who do not, as well assexe and locationn may equally contribute to either negative orpositive perceptionsn about ICT availability and its usage in teaching and learning. Thus, the researchers sought to investigate students' perceptions of the availability and usage of ICT in teaching and learning in senior secondary schools in Kogi State, Nigeria.

1.1 Objectives

The specific objectives of the study were as follows:

1. This study investigates students' perceptions of the availability of ICT tools in teaching and learning in senior secondary schools in Kogi State, based on gender.
2. perception of students on the usage of ICT in teaching and learning in senior secondary school in Kogi State based on school location

1.2 Research Questions

1. What is the students' perceptions of the availability of ICT tools in teaching and learning in senior secondary school in Kogi State, based on gender
2. What is the perception of senior secondary school students in Kogi State regarding the use of ICT in teaching and learning based on school location?

1.3 Hypotheses

$H0_1$: Male and female students did not differ significantly in their perceptions of the availability of ICT tools in teaching and learning in senior secondary school in Kogi State.

$H0_2$: Urban and rural students do not differ significantly in their perceptions of the use of ICT in teaching and learning in senior secondary school in Kogi State.

2. Literature Review

2.1 ICT Integration in Education

The integration of information and communication technology (ICT) into education has gained significant attention because of its potential to transform teaching and learning methodologies. The availability and usage of ICT tools in educational settings can enhance student engagement, facilitate personalized learning experiences, and improve access to information. These tools, including computers, tablets, interactive whiteboards, and online platforms, have the capacity to improve academic outcomes by fostering collaboration, critical thinking, and creativity among students (Basri et al., 2018; Nicholson, 1921). The availability of infrastructure, such as reliable internet connectivity, access to digital devices, and supportive institutional policies, plays a crucial role in maximizing the impact of ICT in the classroom (Flores & Samuel, 2019).

2.2 Disparities in ICT Availability and Usage

Despite the benefits of ICT in education, disparities in availability and usage persist, particularly in developing regions. Research has shown that gender, location, and socioeconomic factors significantly contribute to students' perceptions of ICT tools in teaching and learning. In Kogi State, Nigeria, for instance, female students tend to perceive a higher level of ICT availability than male students, reflecting gender differences in access and engagement with digital tools (Gebhardt, Thomson, Ainley, & Hillman, 2019). Additionally, urban students generally have better access to ICT resources than their rural counterparts. This disparity is often due to better infrastructure, more access to devices, and improved internet connectivity in urban areas, whereas rural students face challenges, such as unreliable power supply and limited access to technology (Cullen, 2001; Teece, Pisano, & Shuen, 1997).

2.3 Barriers to Effective ICT Utilization

Several barriers hinder the effective use of ICT in secondary schools, particularly in rural areas. These include limited access to ICT resources, inadequate training for teachers and students, and infrastructure limitations, such as poor internet connectivity and a lack of digital devices (Adarkwah, 2021). Moreover, institutional policies and cultural factors can further exacerbate these challenges, making it difficult for schools to integrate ICT into their teaching processes effectively. The lack of clear guidelines, insufficient professional development for educators, and lack of support from educational authorities contribute to the ineffective use of ICT in many schools (Scherer et al., 2019).

2.4 Gender and ICT Perception

Gender differences in the perception and use of ICT have been well documented in several studies. Research suggests that female students in Kogi State have higher perceptions of the availability and effectiveness of ICT in education than male students. This finding aligns with the work of Gebhardt et al. (2019), who noted that gender plays a significant role in how students interact with and benefit from ICT tools. Female students often perceive ICT tools as enhancing their learning experiences, whereas male students may view them more as technical aids. This gender disparity is crucial when considering how ICT resources are allocated and utilized in educational settings (Haleem, Javaid, Qadri, & Suman, 2022).

2.5 ICT Usage in Urban and Rural Areas

The divide between urban and rural areas is another significant factor influencing the perception of ICT usage in teaching and learning. Urban students tend to have more frequent and effective use of ICT tools because of better infrastructure, such as reliable electricity and high-speed internet. In contrast, rural students often struggle with inconsistent power supply, limited internet access, and fewer ICT devices available in their schools (Ahmad & Sheikh, 2022). This geographic divide significantly impacts students' ability to engage with ICT and affects their overall perception of its utility in the classroom. As noted by T. Emmanuel et al. (2021), students in rural areas tend to perceive ICT tools as less available and less effective for their learning because of these infrastructural challenges.

2.6 The Role of ICT in Developing Digital Literacy

The role of ICT in developing digital literacy skills is critical for preparing students for future academic and career opportunities. Digital literacy, which includes information literacy, media literacy, and technological proficiency, is an essential skill in today's technology-driven world. Integrating ICT into education helps students develop these skills, which are necessary not only for academic success but also for navigating the increasingly digital workforce (Linjawi & Alfadda, 2018; Van Laar et al., 2017). Studies have shown that exposure to ICT in the classroom improves students' problem-solving abilities and critical thinking, thus enhancing their academic performance and future prospects (Bond et al., 2019).

3. Methodology

This study used a descriptive survey research design. According to Nworgu (2015), a descriptive survey research design is one in which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The target population of this study comprised 1034 students in all the senior secondary schools in Kogi State. The sample size for this study was 318 students out of a population of 3, 233. To arrive at this sample size, the researcher adopted a random sampling technique by selecting two schools from each senatorial zone, resulting in a total of six senior secondary schools.

These six schools comprised a population of 3,233. The researcher further considered the formula of Creswell and Miller (2000), which states that the sample size is determined by ranges of percentages based on the study population. The schools were randomly selected from a box after their names were written on pieces of paper and then squeezed appropriately. The selected schools formed the sample group with a total population of 3, 233. Therefore, 318 students were used as respondents based on 10% of Glenn (2012). The sampled population is shown in Table 5.

Table 1: Sample size distribution

No	School	Population	Sampled
Kogi East Senatorial Zone			
1.	Idah Senior Secondary School	560	55
2.	Government Senior Secondary School Ayigba	497	50
Kogi Central Senatorial Zone			

3.	Ebira Community Secondary School Ogaminana	538	52
4.	Comprehensive College Egbe	496	50
West Senatorial Zone			
5.	Government Technical College, Mopa, Mopa-Muro	556	54
6.	Community secondary School Egbeda-Ega	586	57
	Total	**3,233 10%**	**318**

The instrument for this study was a self-structured questionnaire titled Students' Perception of Availability and Usage of ICT Questionnaire (SPAUICTQ). This instrument was divided into two sections, A and B. Section A consisted of the demographic data of the respondents, while Section B consisted of items on students' perceptions of the availability and usage of ICT in teaching and learning. It had 29 items drawn from a 4-point Likert scale ranging from strongly agree (4) to strongly disagree (1). The instrument was validated through face, content, and expert reviews. After the observations and corrections, some items were modified, while others were completely removed, which certified and validated the instrument for the study.

The instrument was pilot-tested using 20 students from St. The reliability of the instrument was assessed using the test-retest method. The reliability of the instrument was assessed using the test-retest method. After two weeks of the first administration of the test, the test was re-administered to the same group of students, and the results of the two administrations were correlated using Pearson's product moment correlation coefficient (PPMCC), which yielded an index value of 0.68 and was considered reliable for the study. The research assistants were guided by the researcher regarding the purpose of the study and how to administer the questionnaire. The use of research assistants facilitated the quick distribution and retrieval of questionnaire copies from the respondents.

The use of research assistants facilitated the quick distribution and retrieval of questionnaire copies from the respondents. The collected data were analyzed using descriptive and inferential statistical tools. Frequency distribution and percentages were used to analyze the demographic data. Frequency distribution and percentages were used to analyze the demographic data. A mean score between 2.50 and above indicated agreement, and a mean score below 2.50 indicated disagreement in answering the research questions. The decision for all the hypotheses was a 0.05 level of significance, and any significance level below 0.05 was rejected in answering all the hypotheses. The decision for all the hypotheses was a 0.05 level of significance, and any significance level below 0.05 was rejected in answering all the hypotheses.

4. Result and Discussions

4.1 Result

Table 2: Distribution of Respondents based on Gender

Gender	Frequency	Percentage (%)
Male	130	40.88
Female	188	59.12
Total	**318**	**100.00**

Table 2 presents the distribution of respondents based on gender. The number of male respondents was 130 (40.88%), while the number of female respondents was 188 (59.12%). This indicates that there were more female than male respondents in this study.

Table 3: Distribution of respondents based on location

Gender	Frequency	Percentage (%)
Rural	119	37.42
Urban	199	62.58
Total	**318**	**100.00**

Table 3 presents the distribution of respondents based on location. The number of rural respondents was 119 (37.42%), while the number of urban respondents was 199 (62.58%). This indicates that there were more urban respondents than rural respondents in this study.

4.1.1 Research Question One

What are the perceptions of senior secondary school students in Kogi State regarding the availability of ICT tools for teaching and learning, based on gender?

Table 4. The students' perception of the availability of ICT tools in teaching and learning in senior secondary school in Kogi State based on gender

N0	Statements	Mean	Std. Dev.	Decision
13	I believe some teachers do integrate ICT into their teaching methods	2.92	.784	Agreed
14	Our teachers do use various ICT tools during teaching and learning	1.96	.871	Agreed
15	Teachers usually use their laptop to demonstrate during teaching and learning	2.54	.764	Agreed
16	My teachers often use their personal ICT tools during teaching	2.58	.864	Agreed
17	Teachers usually ask us to draw on ICT tools during teaching and learning.	2.54	.842	Agreed
18	ICT tools are often show to us by our teachers	3.02	.865	Agreed
19	Students are often asking to bring ICT materials for practical	3.04	.845	Agreed
20	My schools do not utilize any ICT tools during teaching and learning	2.78	.765	Disagreed
21	Our teachers only use laptops as ICT tools during teaching and learning.	2.69	.846	Agreed
22	The school environment is not ICT friendly.	3.04	.854	Agreed
23	ICT tools are often drawn on cardboard and shown to us.	2.95	.798	Agreed
	Sectional Mean	**2.73**	**0.827**	

Table 4 presents the students' perceptions of the usage of ICT tools in teaching and learning in senior secondary school in Kogi State based on location. The sectional mean score of respondents for their perception of the usage of ICT tools in teaching and learning by location was 2.73, with a standard deviation of 0.827. The respondents agreed with most of the items, indicating moderate usage of ICT tools in teaching and learning in senior secondary school in Kogi State, irrespective of location. To further ascertain the perceptions of both male and female, as well as urban and rural respondents, regarding the availability and usage of ICT tools in teaching and learning in senior secondary schools in Kogi State, the hypotheses were tested and presented.

4.1.2 Hypotheses

$H0_1$**:** There is no significant difference between male and female students in their perception of the availability of ICT tools in teaching and learning in senior secondary schools in Kogi State.

Table 5 presents the results of an independent t-test on the difference between male and female students' perceptions of the availability of ICT tools in teaching and learning in senior secondary schools in Kogi State.

Gender	Number	Mean	S.D.	t-value	df	Sig (2-tailed)	Decision
Female	188	2.75	0.749				
				263	316	0.080	Accepted
Male		2.67	0.785				

Table 5 shows significant differences between male and female students' perceptions of the availability of ICT in teaching and learning in senior secondary schools in Kogi State, with a significant value of 0.080 (more than the 0.05 level of significance). The hypothesis that there is no significant difference between male and female students' perceptions of the availability of ICT in teaching and learning was accepted, and it was concluded that male and female students do not differ significantly in their perceptions of the availability of ICT in teaching and learning; however, female students perceived greater availability of ICT in teaching and learning than male students in senior secondary schools in Kogi State.

$H0_2$: There is no significant difference in the perception of students from urban and rural schools on the usage of ICT tools in teaching and learning in senior secondary schools in Kogi State.

Table 6: t-test on the difference between urban and rural students' perceptions of the usage of ICT tools in teaching and learning in senior secondary schools in Kogi State

Gender	Number	Mean	S.D.	t-value	df	Sig (2-tailed)	Decision
Urban	199	2.75	0.847				
	119			.263	316	0.040	Rejected
Rural		2.71	0.807				

Table 6 shows significant differences between urban and rural students' perceptions of the use of ICT tools in teaching and learning in senior secondary schools in Kogi State, with significant values of 0.040 (less than the 0.05 level of significance). Therefore, the hypothesis that there is no significant difference in the perception of urban and rural students regarding the use of ICT tools in teaching and learning was rejected. It was concluded that urban and rural students differed significantly in their perceptions of the utilization of ICT in teaching and learning; urban students perceived greater utilization of ICT tools in teaching and learning than rural students in senior secondary schools in Kogi State.

4.1 Discussion

The findings from research question one revealed that students had a good perception of the availability of ICT tools in teaching and learning, while female students perceived more availability of ICT tools in senior secondary schools in Kogi State (Gebhardt et al., 2019). The corresponding hypothesis revealed that male and female students did not differ significantly in their perception of the availability of ICT in teaching and learning; however, female students perceived more availability of ICT in teaching and learning than male students in Kogi State (Haleem et al., 2022). Students' perceptions could be guided by sight, touch, and practical experience, which can be described as evidence-based.

Based on these findings, it can be said that students in this study area may have utilized ICT tools in their studies, which enhanced their perception of its availability (Kolb, 2014). Yebowaah (2018) made similar findings, finding that the sources of the internet for senior high school students included the school information communication laboratory, mobile phones, household internet facilities, and public internet cafes. In addition, students' access to the internet was found to positively influence their

academic achievement. The study by Onwuagboke, Nzeako, and Enwereuzoh (2022) is further similar to the current study.

They found that there was a very low level of availability and utilization of modern ICT in teaching and assessment, with facilitators perceived as possessing a moderate level of skills and competencies for the use of technology in instructional delivery and assessment. The findings from Hypothesis 1 are similar to those of Oladosu et al. (2021), who found that secondary school students perceived MICT as useful and easy to use; they used MICT for learning; and irrespective of their gender. The similarities could be as a result of some ICT facilities and the independent variable, which is gender. The findings from research question two indicated that there was moderate usage of ICT tools in teaching and learning in senior secondary schools in Kogi State, irrespective of location (Hu, Gong, Lai, & Leung, 2018; Suárez-Rodríguez, Almerich, Orellana, & Díaz-García, 2018).

While the corresponding hypothesis revealed that urban and rural students differed significantly in their perception of the utilization of ICT in teaching and learning, urban students perceived more utilization of ICT tools in teaching and learning than rural students in senior secondary schools in Kogi State (Cullen, 2001; Teece et al., 1997). The environment plays a role in terms of the usage of ICT because of the network and constant power. This environment can be categorized as urban or rural. These findings are similar to those of Halim and Sulaiman (2020,)who found that students perceptionsn ofmultimedia e-learningghelped increasee student's performance.

The results have shown that students have demonstrated better learning performance through e-learning. E-learning refers to the operational part of ICT tools, which indicates the similarities between current findings and the findings of Halim and Sulaiman (2020). These findings are further similar to those of Ahmad and Sheikh (2022), who found that students at the University of the Punjab have access to various types of ICT applications and resources. Moreover, they have an adequate number of ICT equipment available for their use and are familiar with various types of ICT applications and resources that they use in various educational tasks during their studies. The findings from hypothesis two is related with the findings of S. M. Emmanuel (2017), he found that, urban and rural differ significantly in the utilization of ICT tools in teaching and learning. The similarities were based on significant differences in the utilization of ICT tools in teaching and learning across locations.

5. Conclusions

5.1 Conclusion

Based on the findings of this study, it can be concluded that students in Kogi State perceive a moderate availability of ICT tools in their teaching and learning environments, with female students having a slightly higher perception of the availability of ICT compared to their male counterparts. Additionally, the study found that ICT tools were used at a moderate level in the teaching and learning process, irrespective of whether students were located in urban or rural areas. However, urban students generally perceive higher utilization of ICT tools than their rural counterparts, likely due to better infrastructure and access to digital resources in urban areas.

5.2 Research Limitations

This study has several limitations. First, it relied on self-reported data, which could have introduced bias based on students' perceptions and their ability to accurately assess the availability and usage of ICT tools. Additionally, the study was limited to six schools in Kogi State, which may not be representative of all senior secondary schools in the region. Moreover, the research did not account for the dynamic nature of ICT availability and usage, which may change over time or with the introduction of new government policies or technological advancements.

5.3 Suggestions and Directions for Future Research

Future research should explore a larger and more diverse sample of schools across different regions to improve the generalizability of the findings. It would also be beneficial to conduct qualitative studies, such as interviews or focus groups, to gain deeper insights into the factors influencing students' perceptions and the barriers to ICT usage in teaching and learning. Further research could also examine

the impact of teacher training and professional development on the effective use of ICT tools in schools. Investigating the role of government policies and infrastructure development in facilitating ICT integration in education is another valuable direction for future studies.

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