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Research Article

Digital Divide Challenges and Their Impact on Teaching and Learning in Secondary Schools in Anambra State

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Abstract
The world is becoming a global village where conventional teaching and learning is changing to meet the 21st century innovation demands in terms of technological advancement in service delivery in education all over the world. This research explores the challenges associated with the digital divide and its effects on instructional practices in public secondary schools within Awka South Local Government Area, Anambra State. The study was structured around three guiding questions and a single hypothesis assessed at a 0.05 level of significance. Utilizing a descriptive survey design, the study sampled 122 teachers from a population of 488 across 19 secondary schools, selected through simple random sampling. Data collection employed a validated 15-item instrument, demonstrating a reliability index of 0.74 using Cronbach's alpha. Results indicated a significant relationship between digital divide components, specifically accessibility, and their educational consequences and effective teaching and learning. Key statistical results include: $r = 0.607$ and $r = 0.542$ ($p < 0.05$). Additionally, the regression model ($F(4,118) = 20.271$; $p < 0.05$) highlighted that digital divide variables collectively accounted for notable variations in instructional outcomes. Both access challenges ($\beta = 0.449$) and impact-related issues ($\beta = 0.251$) significantly influenced outcomes. Based on these insights, the study recommends, among other that the government should provide secondary schools with adequate facilities and equipment necessary to ensure that the digital divide is relinquished. This will go a long way to see that no school is left behind in the utilization of digital tools. Additionally, suggestions for further studies were made.

Keywords: Digital Divide, Technology, Teaching, Learning, Public Secondary Schools

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1. INTRODUCTION

Education globally is undergoing dynamic change, with ongoing innovations aimed at improving teaching quality and delivery methods. Instructional designers are increasingly tailoring strategies to meet contemporary learner needs, while the rapid advancement of technology continues to reshape various sectors education included. As educational institutions strive to align instructional practices with 21st-century demands, improving teaching effectiveness has become a top priority.

Historically, classroom instruction relied heavily on the teacher's expertise and available physical resources. As noted by Dacies (2021), teachers enhance learning by incorporating tools like case studies, simulations, and hands-on exercises. In recent years, however, there has been a marked shift toward using digital technologies to enrich both teaching and learning (Dunmill & Arslanagil, 2016).

Chipeta (2018) observed that digital resources empower students to think critically and develop technological proficiency. These tools also support student-centered learning aligned with contemporary curriculum goals. Korte and Husing (2017) further noted that digital integration involves using computing tools, audiovisuals, cloud platforms, and communication technologies to create and distribute educational

content. Song et al. (2016) highlighted how tools like virtual classrooms, email systems, and educational software enhance instruction by improving flexibility and accessibility. Despite these advantages, many schools—especially in less-resourced areas—struggle to implement digital tools due to significant gaps in access and skills.

1.1. Problem Statement

The outbreak of COVID-19 accelerated the global shift toward digital education, compelling schools to transition to remote learning and impacting over 1.2 billion students worldwide (Igi, 2021). This abrupt change exposed longstanding disparities in digital access, particularly in regions like Awka South, where many public secondary schools lacked the foundational infrastructure for effective online instruction. Both students and educators faced challenges such as inadequate access to devices, unreliable internet connectivity, and limited experience with digital learning platforms.

The urgency of the situation revealed the vulnerability of educational systems that were ill-equipped to integrate technology effectively. While some nations adapted quickly, others—particularly those with underfunded school systems—struggled to bridge the technological gap. In Awka South, the slow adoption of digital tools continues to hinder teaching and learning. This study seeks to identify the core contributors to the digital divide and analyze their effects on classroom instruction in public secondary schools in this region.

1.2. Purpose of the Study

The primary goal of this research is to assess how the digital divide affects teaching and learning in public secondary schools within Awka South Local Government Area. Specifically, the study aims to:

1. Evaluate the influence of limited digital access on teaching and learning outcomes.
2. Investigate how often digital tools are used and how this frequency affects instructional practices.
3. Examine how users' skills and comfort levels with digital technologies relate to teaching effectiveness and student learning.

1.3. Research Questions

This study is guided by the following key research questions:

1. How do digital divide factors such as access, usage frequency, and user competence relate to teaching and learning in public secondary schools in Awka South L.G.A.?
2. To what degree do these digital divide components collectively impact the effectiveness of instructional practices?
3. What is the individual effect of each digital divide component on teaching and learning outcomes?

1.4. Empirical Studies

Hoorani, Awwad, and Daher (2022) conducted a study in Palestinian public schools to examine teachers' views on the digital divide. Through qualitative methods involving semi-structured interviews and online surveys with 42 purposively sampled educators, they identified substantial inequalities in access to digital tools. These disparities were consistent across motivation, infrastructure, digital skills, and actual usage the core categories in Van Dijk's digital divide model.

In the United Kingdom, Kormos and Wisdom (2022) explored how technological disparities shape instructional strategies among public school teachers. Their quantitative research, which included 423 educators, revealed significant differences in how teachers across urban, suburban, and rural settings utilized technology. For example, teachers in urban schools were more likely to implement digital tools in classroom discussions and student-led tasks.

Sibanda, Mapenduka, and Furusa (2016), in their study of secondary schools in Kwekwe, Zimbabwe, found that basic ICT tools were largely unavailable. Similarly, Kim and Bagaka (2015) performed a multilevel study in Ohio, USA, to examine how student and teacher characteristics influence technology use. Their research highlighted that students from suburban backgrounds had notably more access to educational technologies than their rural counterparts, both at home and in school.

Wakili (2015) reported that in technical colleges across Yobe State, Nigeria, ICT facilities were minimal, and both teachers and learners had limited exposure. Despite this, where technology was available, improvements in lesson planning and student interaction were evident. In a related study, Salehi and Salehi (2012) explored the challenges faced by Iranian high school teachers in adopting ICT. Key barriers included inadequate technical support, unreliable internet, and limited classroom time. Together, these studies illustrate a recurring global issue: technological inequality continues to hinder educational advancement, especially in resource-constrained environments.

2. METHODS

This research adopted a cross-sectional survey design to gather current data on the perceptions and realities of digital divide issues affecting public secondary schools. The study population included 488 teachers from 19 public secondary schools located in Awka South L.G.A. From this group, a sample of 122 participants was selected through simple random sampling. Ten schools were randomly chosen, and approximately 10% of the teaching staff from each school were proportionately selected. A structured 15-item questionnaire titled Questionnaire on Digital Divide Issues on Teaching and Learning (QUDDITL) was the primary data collection instrument. The items were rated using a four-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). Content validation was performed by two faculty experts in education, and reliability was confirmed with a Cronbach's Alpha coefficient of 0.74, indicating a satisfactory level of internal consistency.

Data collection was executed by the researcher and two trained assistants, with a 100% return rate of the administered questionnaires. The data were analyzed using SPSS, employing Pearson Product-Moment Correlation and Multiple Regression Analysis to answer the research questions and test the hypothesis.

3. RESULTS

Out of the 122 respondents, males accounted for 50.8%, while females made up 49.2%. Most participants identified as Igbo (83.7%), with the majority practicing Christianity (81.1%).

Research Question 1: Relationship between Digital Divide and Teaching Outcomes

The correlation analysis showed a statistically significant positive relationship between digital divide issues and teaching outcomes ($r = 0.607$, $p < 0.05$). Similarly, implications of the divide also showed a positive correlation ($r = 0.542$, $p < 0.05$), confirming that both variables have a measurable impact on instructional effectiveness in the schools surveyed.

Research Question 2: Combined Influence of Independent Variables

Regression analysis indicated a strong collective influence of digital divide issues and their implications on teaching and learning ($R = 0.735$, Adjusted $R^2 = 0.514$). The model explained 51.4% of the variance in instructional outcomes, with the overall regression being statistically significant ($F(4,118) = 20.271$, $p < 0.05$).

Research Question 3: Individual Contributions of Predictors

The standardized regression coefficients indicated that both digital divide issues ($\beta = 0.449$, $t = 4.119$, $p < 0.05$) and their implications ($\beta = 0.251$, $t = 2.193$, $p < 0.05$) made significant individual contributions

to teaching and learning. This underscores the relevance of each variable in influencing classroom outcomes.

4. DISCUSSION

The results confirm a meaningful link between digital divide factors and teaching effectiveness in public secondary schools within Awka South L.G.A. These findings are consistent with those of Hoorani et al. (2022), who emphasized that inequities in access, skills, and motivation continue to challenge ICT adoption in educational institutions.

The study also showed that digital divide components collectively play a significant role in shaping learning environments. This supports the conclusions of Salehi and Salehi (2012), who identified obstacles like limited connectivity, lack of technical support, and constrained instructional time as major hurdles to ICT implementation.

Furthermore, the findings reveal that both access and utilization challenges must be addressed. These range from lack of infrastructure to insufficient training, and teachers' ongoing reliance on conventional chalkboard methods. As pointed out by scholars like Ertmer (2017) and Korte & Husing (2017), teacher readiness and institutional support are just as critical as the physical availability of digital tools.

The COVID-19 pandemic further highlighted the urgency of bridging these gaps. While digitally equipped schools managed a smoother transition to online platforms, under-resourced institutions experienced severe disruptions in learning. This reinforces the calls from Iivari et al. (2020) and UNICEF (2022) for inclusive policies and digital equity in education.

The study highlights how the lack of digital resources significantly restricts their application in instructional delivery across public secondary schools. Many schools are unable to meet basic instructional needs, let alone implement digital solutions—demonstrating the critical impact of limited access on teaching and learning. Moreover, many teachers remain more comfortable with traditional chalk-and-talk methods due to limited technical skills. This hesitancy to adopt digital tools underscores the role of teacher training and attitudes in either enabling or hindering technology integration in classrooms.

Another notable finding is the absence of structured training programs to build teachers' digital competencies. Without adequate preparation and ongoing professional development, teachers struggle to effectively incorporate digital tools, deepening the digital divide. Overall, digital inequality remains a substantial barrier to educational equity, potentially widening the performance gap between well-equipped and poorly equipped schools.

To address these challenges, the following are recommended:

1. Require digital literacy as a prerequisite for both students and teachers.
2. Ensure equal distribution of digital tools and internet access across all schools, including those in rural areas.
3. Launch regular, government-sponsored training programs to enhance digital skills.
4. Encourage partnerships with private entities and communities to set up shared digital learning centers in local areas.

5. CONCLUSION AND RECOMMENDATIONS

The findings of this research demonstrate that digital access limitations critically hinder the use of technology in teaching and learning. Many schools in the study area are still grappling with broader resource constraints, with digital tools being among the least prioritized.

The study also shows that many educators favor traditional methods due to insufficient technical knowledge, and they are often unprepared to use digital platforms effectively. A lack of training and infrastructure continues to weaken efforts to modernize instructional delivery.

In conclusion, the digital divide continues to present a serious challenge in the studied schools, with far-reaching implications for student learning outcomes.

Based on these insights, the following recommendations are proposed:

1. The Federal Government should prioritize the provision of adequate ICT infrastructure and teaching resources across all secondary schools.
2. School administrators must champion the integration of digital tools through proper infrastructure and policy support.
3. Ministries of Education and Communications should collaborate to ensure consistent digital access and training in public schools.
4. Teachers should receive continuous, hands-on professional development on integrating digital technologies into classroom instruction.
5. Curriculum developers should incorporate digital competencies into subject content, allowing teachers to naturally embed technology into their teaching practice.

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Research Ethics. We hereby state that article authored by us is an original contribution. It has not neither been submitted for publication nor published elsewhere in any print/electronic form. It does not infringe on the right of others and does not contain any libelous or unlawful statements. We represent that we have taken the consent from our relevant Institution before taking proceeding on the research both data collection and publishing of our article.

Data Availability Statement. Primary data were used for the study and are available on request.

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