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Digital Natives or Digital Divide? Student Voices on ICT-Enhanced Learning in Ghanaian Secondary Education

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Abstract: In Ghanaian secondary schools, increased ICT integration has created a complicated landscape where students balance digital opportunities and persistent disparities. Policy frameworks portray ICT as transformative for learning outcomes and 21st-century skill development, while student experiences are more nuanced. A semi-structured interview of twenty students and three focus groups at St. Roses Senior High School in Akwatia, Ghana, analyzes how young people experience ICT-enhanced learning. Students discussed their experiences with digital tools, collaboration platforms, and educational technology difficulties via semi-structured interviews and focus groups. While students are adaptable and enthusiastic about ICT integration, they face considerable challenges like unreliable connectivity, device shortages, and unequal access that create new kinds of educational exclusion. Students had significant understandings of how ICT improves learning, peer collaboration, and career preparation, but they were frustrated by systemic barriers to reaping these benefits. The study challenges "digital native" ideas by showing how structural disparities affect Ghanaian youth technology access and use. These student perspectives emphasize the need for equity-centered ICT integration that addresses infrastructural and access gaps, which informs educational policy and practice.

Keyword: Student perspectives, ICT integration, Digital natives, Secondary education, Ghana

INTRODUCTION

The discourse concerning youth and technology frequently characterizes contemporary students as "digital natives," individuals who have been immersed in digital technologies from an early age and exhibit inherent technological proficiency. This characterization indicates that students inherently adjust to educational technologies and uniformly gain advantages from their incorporation into learning environments (Manu et al., 2024; Soma et al., 2021). This assumption fails to account for the complex realities faced by many students, especially in developing contexts characterized by uneven access to technology and persistent infrastructure challenges.

The integration of ICT into secondary education in Ghana presents considerable opportunities as well as notable challenges. The Ministry of Education has enacted policies designed to enhance teaching and learning via technology, acknowledging ICT as crucial for equipping students for engagement in the global digital economy (Aidoo & Chebure, 2024). However, beneath these policy goals are the daily experiences of students who must manage the practical challenges of technology integration in resource-limited educational settings.

St. Roses Senior High School in Akwatia, Eastern Region, offers a valuable perspective for analyzing student experiences. This girls' secondary school, catering to students from varied socioeconomic backgrounds, illustrates the opportunities and challenges inherent in Ghanaian secondary education. Students present with differing degrees of technology exposure, varying access to devices at home, and distinct expectations regarding the role of ICT in enhancing their learning experiences.

The perspectives of these students are predominantly excluded from policy dialogues and scholarly investigations regarding ICT integration in Ghana. Many studies emphasize infrastructure development, teacher training requirements, and administrative viewpoints (Asare et al., 2023; Soma et al., 2021),

viewing students mainly as beneficiaries instead of recognizing them as active agents with distinct perspectives on the realities of educational technology. This study focuses on student perspectives, acknowledging that young individuals have advanced insights into the influence of technology on their learning experiences, social interactions, and future aspirations.

The study examines a significant gap in the comprehension of student experiences regarding ICT integration in secondary schools in Ghana. National policies highlight the transformative potential of educational technology (Manu et al., 2024); however, students' actual experiences demonstrate complex dynamics involving engagement and exclusion, enthusiasm and frustration, as well as collaboration and isolation. The student narratives reveal the potential and constraints of existing ICT integration methods, providing insights that may guide the development of more equitable and effective technology policies and practices.

The study engages four primary questions from the viewpoints of students: What is the experience of senior high school students with ICT-enhanced learning in their daily educational activities? What opportunities does ICT provide for student collaboration, engagement, and skill development? What obstacles do students face in the access and utilization of educational technologies? What is the students' perception of the role of ICT in their future academic and career goals?

This study is significant for its potential to guide the development of more student-centered methods in the integration of educational technology. It enhances existing literature by prioritizing student perspectives, acknowledging young individuals as informed agents who can provide significant insights into educational innovation. The findings hold significance for policy formulation, institutional practices, and the theoretical framework surrounding technology adoption in educational settings. The next section looks at the review of literature.

LITERATURE REVIEW

ICT INTEGRATION IN GHANAIAN EDUCATION: POLICY AND PRACTICE

Ghana's dedication to incorporating ICT in education aligns with global trends that acknowledge technology as crucial for learning in the twenty-first century. The ICT in Education Policy framework established by the Ministry of Education delineates significant objectives for the transformation of teaching and learning via technology integration (Aboagye, 2019; Asare et al., 2023). These policy initiatives establish ICT as a catalyst for developing digital literacy skills, thereby preparing students for engagement in the global digital economy.

The implementation of these policies demonstrates notable discrepancies between aspiration and reality. Research consistently shows that although policy frameworks offer explicit guidelines for ICT integration, practical implementation challenges pose barriers that hinder the achievement of these objectives (Boateng et al., 2024b; Darkwa & Acquah, 2022; Soma et al., 2021). Infrastructure limitations, such as unreliable internet connectivity and insufficient device availability, pose significant challenges that influence students' experiences with educational technology (Nii Akai Nettey et al., 2024).

The variations in ICT access and implementation among various regions and school types result in a "digital divide" in Ghanaian education (Abedi, 2024; Baako & Abroampa, 2024). Rural schools face significant infrastructure challenges that urban institutions do not encounter to the same extent, resulting in unequal opportunities for students to access educational technologies. Systemic inequalities influence student experiences in manners that policy frameworks frequently do not sufficiently address.

STUDENT PERSPECTIVES ON EDUCATIONAL TECHNOLOGY

Although students are central to educational technology initiatives, research specifically addressing student perspectives is limited within the Ghanaian context. The existing literature predominantly emphasizes teacher experiences, administrative challenges, and infrastructure needs, often portraying students as passive recipients of technological interventions instead of recognizing them as active agents (Acquah, 2022), with significant insights into the realities of ICT integration (Quaicoe & Pata, 2018).

Research indicates that students have advanced insights into the impact of technology on their learning experiences, social interactions, and academic results (Quaicoe & Pata, 2018). Young individuals exhibit significant adaptability in utilizing digital tools and platforms, frequently acquiring informal technological skills through peer collaboration and experimentation (Manu et al., 2024). Nonetheless, this adaptability must not be mistaken for uniform access or equitable outcomes, as structural inequalities persistently influence the experiences of various students with educational technology.

Research conducted in various African contexts indicates that students appreciate the integration of ICT when it improves their learning experiences, fosters collaboration, and cultivates skills deemed pertinent to their future careers (Darkwa & Acquah, 2022; Meladi & Awolusi, 2019). Students express frustration regarding the unreliability of technological tools, limited access, and the failure of ICT integration to meet their genuine learning needs.

DIGITAL NATIVES OR DIGITAL DIVIDE?

The term "digital natives" is widely recognized in educational discussions, indicating that youth raised with digital technologies inherently possess technological skills and naturally benefit from the integration of information and communication technology (Janschitz & Penker, 2022; Russo, 2019). This characterization suggests that students consistently accept educational technologies and readily adjust to digital learning environments.

Critical examination of this concept reveals limitations, especially in contexts with uneven access to technology. Research shows that technological proficiency and comfort levels among students differ markedly due to factors including socioeconomic status, prior exposure to technology, and the presence of support systems (Adarkwah, 2021; Williams, 2011). The narrative of "digital natives" may obscure significant differences (Khanal, 2023) and result in policies that presume a uniform level of technological readiness among students.

In Ghana, infrastructure challenges and resource limitations pose significant barriers to technology access (Boateng et al., 2024a; Darkwa, 2022), necessitating a thorough examination of the digital native concept. Students may exhibit enthusiasm for ICT integration, yet encounter significant barriers that hinder their full participation in digital learning opportunities (Manu et al., 2024). Analyzing these dynamics necessitates consideration of both student agency and the structural constraints that influence their experiences.

COLLABORATIVE LEARNING AND ICT

The perspectives of students are particularly valuable in understanding the role of ICT in facilitating collaborative learning experiences. Digital platforms and tools enable novel peer interactions, knowledge sharing, and collective problem-solving that transcend conventional classroom limits (Mensah et al., 2022). Students frequently create novel methods for utilizing collaborative technologies that educators and policymakers may not foresee.

Studies indicate that students appreciate ICT tools that facilitate collaborative project work, resource sharing, and peer support for learning beyond formal classroom settings (Mensah et al., 2022). Platforms like Google Docs, WhatsApp study groups, and educational applications facilitate peer teaching and collaborative knowledge construction, provided that students have sufficient access and support (Manu et al., 2024).

Collaborative ICT use reveals equity issues, as students with superior access to devices and internet connectivity may gain advantages in engaging in digital collaborative activities. Disparities can inadvertently generate new forms of exclusion (Mensah et al., 2022) in collaborative learning environments, resulting in some students becoming central contributors while others remain peripheral participants due to access limitations.

THEORETICAL FRAMEWORK

TECHNOLOGY ACCEPTANCE MODEL AND STUDENT AGENCY

The Technology Acceptance Model (TAM) offers a framework for analyzing student decision-making regarding the use of educational technologies. The Technology Acceptance Model, introduced by Davis (1989), posits that technology adoption is primarily influenced by two factors, namely perceived usefulness and perceived ease of use. In educational settings, students' readiness to utilize ICT tools is associated with their perceptions of the enhancement of learning experiences through these technologies and their ability to navigate digital platforms effectively.

From a student perspective, perceived usefulness includes immediate academic advantages as well as long-term skill acquisition and career readiness. Students are likely to adopt technologies they consider pertinent to their future goals, despite facing initial difficulties or needing extra effort to learn them (Venkatesh & Davis, 2000). This proactive perspective differentiates student technology adoption from mere utilitarian assessments.

The perceived ease of use is particularly significant in contexts where students have limited prior exposure to educational technologies or where technical support is inconsistent. The confidence of students in their capacity to utilize ICT tools effectively impacts their readiness to engage with these technologies for educational purposes (Davis, 1989). Students exhibit increased enthusiasm for ICT integration when they engage with reliable and user-friendly technologies.

Nonetheless, TAM's emphasis on individual perceptions requires augmentation through consideration of structural factors that affect technology access and utilization. Students may view technologies as beneficial and user-friendly, however, they encounter obstacles such as device availability, internet connectivity, and institutional support that hinder their effective engagement with these tools.

DIFFUSION OF INNOVATION IN STUDENT COMMUNITIES

Rogers' (2003) Diffusion of Innovation theory provides insights into the dissemination of ICT adoption among student communities. Students frequently act as informal technology mentors for their peers, disseminating knowledge about digital tools and platforms via peer networks that function independently of formal instruction. Peer-to-peer learning processes facilitate the acceleration of technology adoption and the establishment of supportive learning communities.

In student populations, adoption patterns may illustrate characteristics identified by Rogers (2003), innovators who actively experiment with new technologies, early adopters who accept innovations following initial benefits, and various majority groups who adopt technologies as they become normalized within peer networks. Analyzing these adoption patterns can guide strategies for promoting equitable ICT integration that utilizes peer learning and addresses access barriers.

The social dimensions of innovation diffusion are crucial in educational contexts, as collaborative learning and peer support significantly influence student experiences. Students may adopt technologies based on personal perceptions as well as through observing peer usage and engaging in collaborative activities that necessitate digital tools (Buabeng-Andoh, 2019).

METHODOLOGY

RESEARCH DESIGN

This research utilized a qualitative case study approach to examine student perspectives regarding ICT integration at St. Roses Senior High School. The case study approach facilitates a thorough analysis of student experiences within their unique institutional and cultural contexts, yielding valuable insights that quantitative surveys may miss (Creswell & Poth, 2018). The study concentrates on a single institution, enabling an in-depth understanding of the complexities of student experiences within the specific context of Ghanaian secondary education.

The study employs an interpretivist philosophical approach, acknowledging that student experiences with educational technology are socially constructed and can be most effectively understood through their narratives and perspectives. This approach positions students as knowledgeable agents who can provide valuable insights into the realities of ICT integration, thereby challenging research traditions that regard young people mainly as subjects of study instead of as collaborative partners in knowledge construction.

STUDY SETTING

St. Roses Senior High School is a suitable location for analyzing student perspectives on the integration of ICT in secondary education in Ghana. The school, situated in Akwatia, Eastern Region, caters to students from a range of socioeconomic backgrounds, exhibiting diverse levels of prior technology exposure and varying access to digital resources at home. This diversity offers avenues to investigate the influence of structural inequalities on student interactions with educational technology.

The ICT infrastructure of the school comprises computer laboratories, internet access, and a combination of conventional and technology-enhanced learning environments. St. Roses, similar to numerous secondary schools in Ghana, encounters persistent issues concerning reliable electricity, consistent internet access, and sufficient device availability. The conditions illustrate overarching trends in Ghanaian education and offer insights into student experiences with ICT integration in resource-limited settings.

PARTICIPANT SELECTION AND CHARACTERISTICS

The research included twenty students chosen via purposive sampling to guarantee representation from various grade levels, academic programs, and socioeconomic backgrounds. Participants comprised students from Forms 1, 2, and 3, representing the academic tracks of science, arts, and business. This diversity allows for the analysis of variations in ICT experiences among distinct student populations and academic settings.

Participants were chosen based on their readiness to engage and their diverse experiences with educational technology, encompassing both enthusiastic users and hesitant adopters. This approach guarantees that the findings encompass a variety of student perspectives instead of concentrating solely on those most adept with technology. The sample comprises students with varying degrees of access to digital devices and internet connectivity, offering insights into the impact of resource disparities on ICT experiences.

DATA COLLECTION

The data collection process utilized two complementary methods, encompassing individual semi-structured interviews and focus group discussions. This multi-method approach facilitates the triangulation of findings, effectively capturing individual experiences alongside collective perspectives regarding ICT integration.

INDIVIDUAL INTERVIEWS

Twenty individual interviews were conducted, each lasting roughly 30 to 45 minutes. The interviews employed a semi-structured framework, facilitating students' sharing of their experiences while guaranteeing the inclusion of essential research questions. The interview questions examined students' everyday engagement with educational technology, their views on the impact of ICT on their learning, the difficulties they have in accessing and utilizing digital resources, and their ambitions for future technology integration.

Sample interview questions included: "Can you recount an instance when technology significantly enhanced your comprehension of a subject?" "What obstacles do you encounter when attempting to utilize technology for your academic pursuits?" "In what manner do you and your peers utilize technology for

collaborative project work?" "Which technological competencies do you aspire to cultivate for your prospective career?"

The conversational format of these interviews prompted students to disclose comprehensive accounts of their experiences, highlighting both the advantages of ICT integration and persistent disappointments. Students frequently presented specific instances of how certain tools and platforms influenced their learning, providing tangible insights into the realities of educational technology utilization.

FOCUS GROUP DISCUSSIONS

Three focus groups were held, each comprising six to seven students from various grade levels and academic disciplines. Focus groups lasted around 60 minutes and examined collective viewpoints on ICT integration, peer collaboration via technology, and common obstacles in accessing educational technology resources.

Focus group talks were particularly essential in elucidating the social dimensions of ICT integration, encompassing student collaboration via digital platforms, mutual support in technology learning, and the navigation of common problems. The group format facilitated students in enhancing one another's contributions, frequently resulting in profound debates that unveiled intricate perspectives on technology integration.

The interactive format of focus groups facilitated the examination of areas of consensus and dissent among students' experiences, yielding insights into the diversity of student viewpoints within a singular institutional framework. These discussions frequently emphasized how varying family environments, prior technological experience, and academic interests of students influenced their engagement with instructional technology.

DATA ANALYSIS PROCEDURES

The data analysis utilized Braun and Clarke's (2006) thematic analysis methodology, which included systematic coding and the development of themes based on student narratives. All interviews and focus group discussions were audio-recorded with the consent of participants and transcribed verbatim. The analysis commenced with multiple readings of the transcripts to develop familiarity with the data and to discern initial patterns.

Initial coding utilized both inductive methods to identify themes arising from student narratives and deductive methods guided by the research questions and theoretical framework. Codes were created to encapsulate particular dimensions of student experiences, including "collaborative learning," "access barriers," "peer teaching," "future aspirations," and "engagement enhancement."

Codes were systematically organized into overarching themes that encapsulated the fundamental patterns in student experiences. Themes were refined through ongoing comparison across various participants and data sources, ensuring that the findings accurately reflected the diversity of student perspectives captured in the study.

The final themes underwent validation via member checking procedures, in which selected participants reviewed summaries of findings to ensure that the analysis accurately represented their experiences and perspectives. The validation process improved the credibility of the findings by ensuring that interpretations were based on participant narratives.

FINDINGS

The analysis of student interviews and focus group discussions identified five key themes that elucidate students' experiences with ICT integration in Ghanaian secondary education. Themes reflect the opportunities students perceive in educational technology alongside the substantial barriers they face in effectively accessing and utilizing these tools.

INFORMATION AND COMMUNICATION TECHNOLOGY AS A CATALYST FOR IMPROVED LEARNING ENGAGEMENT

Students consistently reported that ICT transformed their learning experiences, enhancing both engagement and motivation. In contrast to conventional lecture-based instruction, technology-enhanced lessons facilitated interactive learning opportunities that students perceived as more engaging and memorable.

A Form 2 student stated, "Using simulations in science allows me to observe phenomena directly rather than merely reading about them in the textbook" (Student Interview). This enhances clarity and improves retention due to observed effectiveness. Focus groups revealed that students found visual and interactive elements effective in understanding complex concepts that appeared abstract in traditional presentations.

Students expressed a preference for ICT tools that facilitated self-paced exploration of topics and enabled repeated engagement with challenging concepts. A Form 3 student remarked, "Educational videos and online resources allow me to revisit content if I did not comprehend it initially... In a traditional classroom setting, if I overlook a concept, it is permanently lost." (Student Interview).

The benefits of engagement transcended individual learning, fostering more dynamic interactions within the classroom. Students indicated a greater willingness to engage in lessons that utilized technology, as these formats facilitated various avenues for contribution. A focus group participant noted that the use of interactive quizzes or online polls allows even quiet students to engage without the need to speak publicly (Focus Group 1).

Students acknowledged that the novelty of technology could occasionally lead to distractions. One student acknowledged, "At times, I become so engrossed in exploring the app that I lose sight of the actual lesson content." (Student Interview). This awareness indicates that students have advanced understandings of the impact of technology on their learning processes, acknowledging both advantages and possible disadvantages.

COLLABORATIVE LEARNING UTILIZING DIGITAL PLATFORMS

Students recognized collaboration as a major advantage of ICT integration, noting that digital platforms facilitated innovative peer learning and group work that transcended conventional classroom limits. Collaborative experiences frequently emerged from student initiative instead of formal assignments, demonstrating students' agency in utilizing technology for educational purposes.

A Form 3 student stated, "We utilize Google Docs for our group projects, which allows simultaneous collaboration on the same document, regardless of our physical locations...We can observe individual contributions and assist one another in enhancing our work." (Student Interview). This collaborative capability altered student engagement in group assignments, fostering equitable participation and ongoing peer feedback.

WhatsApp study groups have become significant collaborative environments, even in the absence of formal endorsement by the school. Students utilized these platforms to exchange resources, engage in discussions on complex concepts, and offer peer support beyond classroom hours. A focus group participant described a WhatsApp group for the class that facilitates the sharing of notes, inquiry regarding homework, and mutual assistance in test preparation. "Assistance is consistently available for those encountering difficulties." (Focus Group 2).

Students participated in peer teaching via digital platforms, where technologically proficient students assisted peers who were less familiar with ICT tools. One student stated, "I assist my friends in learning how to use various applications due to my proficiency with technology." "They assist me with subjects I find challenging". (Student Interview). This draws attention to the reciprocal operation of ICT use and support among students.

The collaborative practices exhibited students' creativity in utilizing available technologies for educational objectives, frequently establishing informal learning networks that offered both academic

and social support. Students observed that collaborative use of ICT could reveal disparities among peers, especially when certain students had superior access to devices and internet connectivity at home.

THE DIGITAL DIVIDE: BARRIERS TO ACCESS AND INEQUITIES

Students demonstrated enthusiasm for ICT integration while providing nuanced analyses of how access barriers contributed to inequalities within their learning community. These findings indicate that students possess a clear understanding of the impact of structural limitations on their educational opportunities and peer relationships.

A Form 2 student stated, "Not all students possess a smartphone or laptop at home, leading to disparities in the ability to complete technology-dependent assignments." (Student Interview). This shows that the expectation for uniform work output among individuals with disparate resources is inequitable.

Internet connectivity has emerged as a significant barrier. Students reported instances in which assignments necessitated online research however, inconsistent internet access hindered their ability to complete tasks effectively. A focus group participant remarked on the unreliability of the internet and the high cost of data for those relying on personal connections. "Occasionally, I initiate work on an online task and subsequently experience a loss of connection midway." (Focus Group 3). This points to how unreliable internet hinders technology integration in learning and beyond.

Students acknowledged the impact of home circumstances on their capacity to engage with educational technology beyond school hours. A Form 3 student noted that students with computers at home can engage in more practice and complete assignments more efficiently. "Individuals lacking home access experience setbacks, despite equivalent effort." (Student Interview). This brings attention to how lack of access to ICT tools affects educational technology integration among different students and their learning at large.

The disparities in access resulted in social divisions among students, leading to the emergence of some as technology leaders while others experienced exclusion from digital learning opportunities. Students articulated concerns regarding the growing influence of external resources on their academic success.

FUTURE GOALS AND REQUIREMENTS FOR DIGITAL LITERACY

Students exhibited progressive viewpoints regarding the integration of ICT and its role in equipping them for future academic and professional prospects. Their aspirations encompassed advanced digital competencies, which they regarded as vital for economic participation and personal development, extending beyond mere basic computer skills.

"Technology is ubiquitous, and it is essential to acquire knowledge beyond merely utilizing PowerPoint," asserted a Form 3 student. (Student Interview). Another Form 3 student noted “I aim to acquire knowledge in coding, app development, and potentially artificial intelligence”. (Student Interview). Focus groups revealed a common sentiment among students, who expressed a strong desire to acquire technical skills that would improve their career opportunities.

Students placed significant importance on ICT learning that was linked to practical applications and professional trajectories. "When learning about technology, it is essential to focus on practical skills that can be effectively utilized," stated a Form 2 student. (Student Interview). Another Form 2 student pointed out "I aim to acquire skills in graphic design, video editing, and digital marketing, as these competencies will facilitate the establishment of my own business in the future." (Student Interview). Through this, the students expressed the aspirations they had on ICT beyond mere typing and computers to encompass practical and technical ICT skills which will benefit their lives in the future.

The global aspect of digital communication attracted students, who perceived ICT skills as facilitating wider connections and opportunities. A focus group participant stated, "Proficient digital skills enable collaboration with individuals from other countries, access to online educational opportunities, and the potential for remote work." (Focus Group 3). This expands opportunities beyond local availability.

Students expressed frustration that current ICT integration frequently emphasizes basic applications instead of fostering the advanced skills they seek. A student remarked, "While we invest time in learning essential tools such as Word and Excel, we also seek opportunities to acquire more creative and technical skills." (Student Interview).

Students exhibited an understanding of the potential of digital literacy to facilitate social change and enhance community development. A Form 3 student proposed that increasing the digital skills of young people could enable the use of technology to address community issues and generate opportunities for others. This perspective suggests that students perceive ICT not only as a means for individual skill enhancement but also as a catalyst for broader social impact.

ADDRESSING TECHNICAL CHALLENGES AND ENSURING SYSTEM RELIABILITY

Students presented comprehensive descriptions of how technical issues and system unreliability impacted their learning experiences, illustrating their adaptability while emphasizing the persistent frustrations caused by insufficient infrastructure. Power outages posed a continual challenge, disrupting ICT-enhanced lessons and generating uncertainty regarding technology availability. A student remarked, "The unpredictability of power outages means that we often begin a computer lesson only to transition to manual work midway...It is frustrating when engagement with the learning material is abruptly interrupted." (Student Interview).

Issues with internet connectivity posed significant challenges for collaborative work and research assignments. A Form 2 student stated, "I may be engaged in an online group project with my classmates, but if the internet disconnects, I am unable to contribute further... My group members may perceive that I am not contributing, but the reality is that I am unable to access the necessary tools." (Student Interview).

Students formulated diverse coping strategies to address technical challenges, such as frequently saving work, devising backup plans for technology-dependent assignments, and providing mutual support when individual issues arose. A focus group participant remarked, "We have learned to anticipate technical issues and develop strategies to accommodate them... "This situation is not ideal." (Focus Group 2).

The variability in technology access influenced students' confidence in utilizing digital tools for significant academic tasks. "I appreciate utilizing technology for educational purposes; however, I harbor reservations regarding its reliability due to frequent failures," stated a Form 3 student... "For significant assignments, I typically create a manual backup as a precaution." (Student Interview).

Students exhibited notable resilience and creativity in response to technical limitations, despite the challenges faced. They frequently cultivated informal troubleshooting abilities and established peer support networks that facilitated collaborative navigation of system issues. This study's findings indicate a complex environment in which Ghanaian secondary school students maneuver between digital opportunities and enduring inequalities. Students exhibit significant adaptability and enthusiasm for ICT integration; however, their experiences complicate the simplistic concept of "digital natives" who uniformly gain from educational technology. The data indicate that structural barriers produce varied experiences that may either improve or restrict students' educational opportunities.

DISCUSSION

The findings from this study reveal a more complex reality than the "digital native" label suggests for Ghanaian secondary students. While participants demonstrated genuine enthusiasm and creativity in adapting digital tools for learning, their experiences were consistently shaped by practical constraints rather than innate technological fluency. Students articulated deep understandings of how technology could enhance their education, yet these insights emerged alongside candid descriptions of infrastructure failures, access inequalities, and frustrations with system unreliability. This disconnects between technological potential and lived experience challenges assumptions that young people automatically thrive in digital learning environments simply by virtue of their age. The findings align with research by

Buabeng-Andoh (2019) and Adarkwah (2021), which suggests that technological adoption depends on contextual factors beyond age or generational membership, demonstrating that enthusiasm for technology integration must be supported by adequate infrastructure, equitable access, and ongoing technical support to translate into meaningful educational benefits.

Student-driven collaborative practices emerged as particularly noteworthy, with participants creating informal learning networks through platforms like WhatsApp and Google Docs that extended well beyond formal classroom requirements. These organic communities demonstrated how learners actively shape technology use when given the opportunity, developing peer teaching systems and mutual support structures that teachers and administrators might not anticipate. However, these same collaborative spaces also exposed troubling equity dimensions, as students clearly recognized how varying home access to devices and connectivity created hierarchies within their peer groups. Some students became central contributors to digital learning communities while others remained peripheral participants, not due to ability or motivation but because of circumstances beyond their control. These insights connect to research by Mensah et al. (2022) and Manu et al. (2024), which emphasizes the potential for ICT to support constructivist learning approaches when implemented thoughtfully, though realizing this potential requires attention to equity and access issues that may not be apparent from teacher and administrator viewpoints.

Perhaps most striking was students' forward-looking perspective on digital skill development and their explicit frustration with current limitations. Participants expressed ambitions that extended far beyond basic computer literacy to encompass coding, artificial intelligence, digital entrepreneurship, and creative technical applications they viewed as essential for future opportunities. Yet they simultaneously described how unreliable infrastructure and curriculum focused on introductory applications left these aspirations largely unmet. These findings extend research by Baako and Abroampa (2024) and Nii Akai Nettey et al. (2024), which documents infrastructure challenges in Ghanaian schools, while revealing the social and emotional dimensions of these technical problems, including feelings of exclusion and concern about falling behind peers due to circumstances beyond their control. This gap between what students envision as meaningful technological education and what they actually experience, which aligns with global trends recognizing the importance of digital literacy for twenty-first-century economic participation (Aidoo & Chebure, 2024), suggests significant opportunities for reimagining ICT integration in ways that genuinely respond to learner needs rather than administrative assumptions about appropriate technology use.

CONCLUSION

This study has revealed that Ghanaian secondary school students possess substantial perspectives on ICT integration that challenge simplistic assumptions about "digital natives" while highlighting both the transformative potential and persistent limitations of educational technology initiatives. Students at St. Roses Senior High School demonstrated remarkable adaptability and creativity in leveraging available technologies for learning purposes, yet their experiences were heavily shaped by structural inequalities that created differentiated access to digital opportunities.

The findings illuminate several key insights that have implications for educational policy and practice. First, students' enthusiasm for ICT integration represents a valuable resource that could be better leveraged through more equity-centered approaches to technology implementation. Rather than assuming uniform technological readiness, policies should address the access barriers that prevent some students from participating fully in digital learning opportunities.

Second, students' creative use of collaborative technologies suggests that young people possess agency in shaping how educational technology is used in practice. Their informal learning networks and peer support systems demonstrate innovative approaches to collaborative learning that could inform more formal curriculum design and pedagogical practice.

Third, the persistence of digital divides within educational institutions indicates that providing ICT infrastructure alone is insufficient to ensure equitable outcomes. Students' experiences reveal the need for comprehensive support systems that address not only device availability but also connectivity, technical support, and strategies for supporting students with limited home access to technology. Students' forward-thinking aspirations for digital skill development highlight opportunities for curriculum innovation that could better prepare young people for participation in the digital economy while building on their existing interests and motivation.

The study's focus on student perspectives provides insights that are often missing from policy discussions dominated by administrative and infrastructural concerns. By centering student voices, the research reveals how young people experience the tensions between digital possibilities and persistent inequalities that characterize contemporary educational technology integration in Ghana. These findings have broader implications for understanding technology adoption in developing contexts, where enthusiasm for innovation intersects with resource constraints and structural limitations. The student narratives captured in this study suggest that meaningful ICT integration requires attention to both technological capabilities and social equity, ensuring that digital innovations enhance rather than exacerbate existing educational inequalities.

Future research should continue to privilege student perspectives while exploring how different institutional contexts, regional variations, and policy interventions affect young people's experiences with educational technology. Longitudinal studies could examine how students' relationships with technology evolve over time and how early experiences with educational ICT influence later academic and career outcomes.

The voices of students at St. Roses Senior High School ultimately reveal both the promise and the challenges of ICT integration in Ghanaian secondary education. Their experiences demonstrate that while technology can enhance learning, promote collaboration, and develop valuable skills, realizing these benefits requires sustained attention to equity, infrastructure, and the authentic needs and aspirations of young learners. By listening to these student voices, educators, policymakers, and researchers can develop more effective and inclusive approaches to educational technology that serve all students rather than privileging those with existing advantages.

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