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Adoption and Utilisation of ICT for Decision-Making in Ghanaian Colleges of Education: An Assessment of Administrators' Practice

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Abstract

This study investigated the adoption of ICT by administrators in Ghanaian colleges of education, highlighting opportunities and challenges, using a convergent mixed-method design. Ten colleges were purposively selected, and 65 administrators were randomly sampled for quantitative data via structured questionnaires. For the qualitative phase, 15 administrators were purposively chosen for in-depth interviews. Quantitative data were analysed using descriptive statistics, while qualitative data underwent thematic analysis. Findings indicate that ICT is commonly used for record-keeping and communication, but more advanced applications such as data analysis, performance monitoring, and lesson planning are limited. Administrators reported moderate ICT proficiency, with notable disparities between rural and urban colleges. Qualitative insights revealed that ICT enhances productivity and supports evidence-based decision-making, yet challenges persist, including inadequate infrastructure, unreliable internet, limited budgets, and resistance to change. Overall, ICT adoption in Ghanaian educational institutions remains in its early stages but shows potential for growth. Recommendations include targeted professional development, equitable infrastructure provision, sustainable financing, and stronger policy alignment. Addressing these gaps could transform ICT from a routine administrative tool into a strategic asset for educational improvement. The study contributes to the broader discourse on ICT integration in African higher education and offers practical guidance for policymakers, institutional leaders, and curriculum developers.

Key terms: Administrators, colleges of education, decision-making, higher education, ICT.

1.0 INTRODUCTION

This study explored the adoption of ICT to enhance decision-making and administrative efficiency within Ghanaian colleges of Education. The integration of ICT into educational management is increasingly vital worldwide, especially in institutional administration and decision-making. For Ghanaian colleges of education, which are key to teacher training and human resource development, adopting and effectively using ICT systems offers valuable opportunities to boost administrative efficiency, support data-driven decisions, and enhance educational quality. Technological innovation in educational management has become essential in today's settings, where administrators must juggle various demands and implement evidence-based strategies for institutional improvement . This research focuses on how Ghanaian colleges of education are currently adopting and utilising ICT tools for administration and decision-making. Although much research highlights ICT's importance in higher education globally, few studies explore the specific practices of educational administrators in colleges of education, especially in developing countries like Ghana. This gap is critical because these colleges play a key role in teacher training and influence the overall quality of basic education across the country.

Educational institutions worldwide are increasingly recognising ICT's transformative potential to improve administrative functions and support data-driven decision-making. Research indicates that ICT can streamline processes, enhance communication, and increase efficiency (Tserr, 2023). However, transitioning from mere technology availability to effective use is complex, especially in resource-limited settings. Studies indicate that successful ICT integration depends not only on infrastructure but also on aligning technological capabilities with organisational readiness, staff skills, and institutional support (Nzuki, 2019).

In Sub-Saharan Africa, and Ghana specifically, ICT adoption in education offers both opportunities and hurdles. Research on LMS acceptance in African higher education revealed growing interest but persistent barriers such as poor ICT infrastructure, lack of technical skills and training, and weak system quality, along with inadequate policies and management support. (Bervell & Umar, 2017). Overcoming these challenges requires strategic planning and stakeholder engagement (Chandio, 2021).

Decision-making plays a vital role in education management, affecting resource distribution, policy enforcement, staff development, and student outcomes. According to Marsh & Farrell, Evidence-Based decision-making refers to the systematic use of empirical data to guide decisions in education (Marsh & Farrell, 2014). Information and Communication Technology includes a broad range of tools and systems used in collecting, storing, and analysing data, including Management Information Systems, Learning Management Systems, and data analytics platforms (Fernandes, 2025). ICT competence refers to the knowledge, skills, and attitudes required for effective use of ICT in decision-making processes. It involves both technical proficiency and the ability to critically evaluate and interpret data to make well-informed decisions. Recent studies stress that effective decision-making increasingly relies on technological tools that support data collection, analysis, and interpretation. Competency in ICT among administrators has been linked to better management and institutional performance. Integrating ICT into decision processes helps move from intuition-based choices to systematic, evidence-based strategies (Bai, 2024).

While the literature provides insights into the relationship between ICT adoption and administrative efficiency, there is still a dearth of empirical studies that examine this phenomenon within the Ghanaian colleges of education. Understanding the unique challenges and contextual factors that influence digital

governance in these institutions is essential for designing targeted interventions that can optimise administrative outcomes (Amedzo, 2019).

This study, therefore, aims at exploring ICT adoption and utilisation for decision-making in Ghanaian teacher training colleges, addressing a gap in understanding how these institutions leverage technology for management. It examines various aspects: the ICT proficiency level of college administrators in Ghana, how Ghanaian college administrators utilise and adopt ICT for decision-making, and the factors that facilitate or hinder this process, and the broader implications for teacher education. The focus on ICT practices in Ghanaian colleges is set within broader educational reforms emphasising decentralisation and school-based management, which grant greater decision-making autonomy to institutions (Nishimuko, 2023). ICT tools are critical for promoting transparent, participatory, and evidence-based decisions. Transforming education sustainably in the digital age requires combining technological infrastructure with capacity building and human resource development. Educational administrators are key in this process, as their decisions on tech adoption directly impact institutional success (Akhmad, 2025). For Ghanaian colleges, understanding current ICT practices provides a foundation for developing targeted programs, policies, and interventions to improve teacher training quality and the overall education system.

2.0 LITERATURE REVIEW

School administrators have a lot of work to accomplish, but to avoid becoming disjointed and ineffective, these tasks should be consistent and marked by coordination and harmonisation (Saitis, 2007). By utilising ICT, these disparate roles could be combined into a single, strategic task for effective and efficient educational performance. An increasing number of studies emphasise how ICT may revolutionise education. ICT integration promotes evidence-based decision-making, enables individualised learning, and improves teaching strategies globally (Asad et al., 2021). To provide high-quality learning experiences and get students ready for the digital age, technological integration in the classroom is crucial (Haleem et al., 2022; Lohans Kumar Kalyani, 2024). This highlights the importance of ICT in enhancing education, access to learning resources, and management.

The rapid advancement of technology pushes students to acquire the critical thinking and problem-solving skills required to succeed in the twenty-first century, thereby improving decision-making. According to Voogt et al. (2013), technology promotes digital literacy, improves academic achievement, and supports personalised learning. Educational institutions use new strategies and pedagogies as technology changes conventional teaching techniques. Students are better prepared for a technologically driven future thanks to this shift toward technology-enhanced learning (Haleem et al., 2022). Digital tools and remote learning platforms have become more popular due to the COVID-19 pandemic, underscoring the significance of integrating technology into education (Ibrahim et al., 2023). Additionally, it has institutionalised digital technologies, which have caused a fundamental change in the educational system. To manage the challenges of deploying digital platforms, steer these changes, and encourage an innovative culture among employees, leadership in educational institutions is essential (Mdhlalose & Mlambo, 2023; Moges, 2014).

Listening, watching, utilising knowledge, promoting communication, and directing groups toward objectives are all components of effective leadership (Voogt et al., 2013; Voogt & Knezek, 2008). Both the accessibility of ICT resources and the efficiency with which educators and students use them are impacted by their leadership. It is therefore imperative for educational administrators to acquire the necessary skills

and knowledge required for 21st-century educational management. Building ICT skills requires training programs, but studies indicate that these efforts must incorporate curricular integration and data-informed planning in addition to technical training (Ertmer, 2005; Kaminskienė et al., 2022). Many Ghanaian colleges of education continue to face issues such as inadequate internet access, a lack of hardware, and a poor attitude toward technology, particularly in rural areas (Mumtaz, 2000; Omboto et al., 2022). Teachers, administrative personnel, and school administrators are the three main groups that are essential to the day-to-day operations and management of effective technology integration in universities. School principals, who act as administrators, require rudimentary ICT skills to oversee and perform everyday administrative duties, according to Afshari et al. (2012).

Principals set an example for their staff by demonstrating how to incorporate computer technology into administrative tasks. Principals assist teachers in integrating computers into their lessons as instructional leaders (Singh & Muniandi, 2012). As transformational leaders, they encourage innovation, tolerance, and the development of a favourable atmosphere that encourages the use of technology (Afshari et al., 2012). Teachers typically choose more engaging methods of instruction and in-house training, and administrators frequently employ PowerPoint presentations to do so (Chen, 2012). Mwalongo (2011) asserts that administrators use ICT apps to create reports, letters, and announcements for parent meetings, staff hiring, and student registration. Additionally, they use ICT for managing web applications, storing data, and making decisions (Selwood, 2004; Af7aal, 2011).

Directors and managers of different offices and divisions are examples of administrative instructors who have both teaching and administrative duties (Lin et al., 2011). Administrative employees can complete their regular tasks more rapidly and precisely thanks to ICT applications. They manage financial activities, communicate, process paperwork, preserve records, and gather data using a variety of instruments. They can handle these duties more skillfully and effectively when they use ICT.

ICT applications also help to preserve financial data for future reference, including balance sheets, pay stubs, audit reports, non-salary awards, inventory records, student evaluation reports, and overall student records (Kawade, 2012; Kazi, 2012). With all these innovations, administrators are seen as key change agents in ICT adoption (David et al., 2019). However, financial and infrastructure problems frequently impede adoption in African contexts (Kipsoi et al., 2012; Bingimlas, 2009). As the global scope looks promising, Ghana has not relented on its effort towards infusing technology to maximize the potency of education, though it is faced with many challenges such as lack infrastructure, digital divide among the urban and rural communities, and attitudinal issues among stakeholders (Amaniampong & Hartman, 2023) To achieves this, various government have enacted educational bills and policies as enablers to technology adoption in educational institutions in Ghana and the colleges of education are no exception. The National Information and Communication Technology for Accelerated Development (ICT4AD) Policy (2015) provided the foundation for ICT integration in Ghana's educational sector. It emphasises the use of ICT tools and infrastructure to enhance teaching and learning, increase access to educational resources, and develop digital skills among teachers, students, and school administrators.

National Education Strategic Plan (NESP) (2018-2030) also embedded a specific focus on ICT integration in education. It aims to ensure that ICT is fully embedded into teaching and learning processes across all levels of education. The plan emphasised providing ICT infrastructure, teacher training, and developing digital content and resources. Ghana's ICT in Education Policy (2019) focuses on integrating ICT into

education to enhance learning outcomes, improve teaching effectiveness, efficient management, and promote digital literacy. It outlines strategies for providing equitable access to ICT resources, training teachers in ICT skills, and integrating ICT into the curriculum. Ghana Digital Learning Strategy (2018-2023). This was launched in 2018 to support the implementation of ICT integration in education. This strategy 18 focuses on harnessing technology to transform teaching and learning practices, expand access to educational resources, and foster digital literacy skills. It outlines the critical areas of action, including infrastructure development, teacher capacity building, curriculum alignment with ICT, and monitoring and evaluation mechanisms.

Ghana Digital Education Transformation Initiative (2020) also aimed to accelerate the integration of ICT into education through various programs and projects. It included initiatives such as distributing free laptops to teachers, developing digital content and resources, and establishing ICT laboratories in schools. Teacher Education and Professional Development are essential to effectively integrating ICT into classrooms. All these policies emphasise the need for ICT adoption in schools and colleges to improve learning and management, and effective decision-making among administrators. This is in line with the need for 21st-century skills around the world, where being able to use ICT effectively is now a prerequisite for teaching, learning, and management. However, there is still a big gap between policy conceptualisation and implementation, as a few of these policies have yet to yield a positive result. It is also important to point out the role of human factors in effective policy adoption and implementation.

The competence and readiness of administrative staff to utilise ICT tools effectively are vital for translating digital governance initiatives into tangible administrative gains (Onuoha et al., 2021). Empirical studies have underscored the importance of continuous ICT training and capacity-building programs for university staff to enhance their digital literacy, adaptability, and confidence in using modern technologies (Lawal, 2020). Training may not only upskill them but also create a culture that embraces innovation and change. Therefore, studying administrators' usage of ICT provides important information on how ready Ghanaian teacher training institutes are to satisfy both domestic and international criteria and also help the national policy of ICT4AD become a reality.

3.0 METHODOLOGY

This study used a convergent mixed-methods design to gain a comprehensive understanding of ICT adoption in Ghana's Colleges of Education. The use of mixed methods was necessary for several key reasons. First, while quantitative data collected through structured questionnaires allowed for measuring ICT proficiency levels, tool usage frequency, and perceived effectiveness among administrators, qualitative data gathered via semi-structured interviews provided essential contextual insights into lived experiences, specific barriers, and institutional dynamics that numeric data alone could not capture. This combination enabled the research to answer "what" questions (through quantitative analysis) and "why" and "how" questions (through qualitative exploration), offering a more nuanced and complete picture of ICT adoption phenomena (Almalki, 2016). The mixed methods approach specifically allowed for simultaneous data collection and analysis of both strands, with integration happening at the interpretation stage to produce meta-inferences that go beyond either method alone.

The population for this study included administrators from 10 selected Colleges of Education in Ghana, representing three major regions: Mount Mary's College, Kibi Presbyterian College, Ada Methodist College, Berekum College of Education, St. Joseph's College, St. Ambrose Akrokerri, St. Louis College, Mampong

Technical College, and Offinso College of Education. The study used a dual sampling approach tailored to each methodological strand. For the quantitative phase, purposive sampling combined with simple random sampling techniques. Purposive sampling helped select colleges based on specific criteria relevant to ICT readiness, geographic distribution, and institutional diversity. This approach was especially useful because it enabled the researchers to deliberately select institutions and respondents who handle administrative tasks and possess detailed knowledge about ICT practices, providing meaningful insights into the research focus (Vedel et al., 2019). After selecting colleges purposively, simple random sampling was used to pick 65 administrators across the 10 institutions, ensuring representation across gender and years of experience (from early career to seasoned practitioners). For the qualitative phase, purposive sampling selected 15 administrators for in-depth semi-structured interviews. These individuals were chosen based on their experience with ICT implementation, their diverse perspectives on technology adoption, and their ability to clearly articulate challenges and opportunities related to technological integration. This intentional selection aimed to capture a range of viewpoints within the institutional context.

The quantitative phase involved administering structured questionnaires to the 65 administrators from the 10 colleges. The questionnaire included closed-ended items measuring three main constructs: administrators' ICT proficiency, how often they used ICT tools in administrative and teaching roles, and their perceptions of ICT's effectiveness in enhancing institutional performance and learning. Data analysis for the quantitative part used descriptive statistics. Means, standard deviations, frequencies, and percentages summarised respondents' responses regarding ICT skills and usage patterns, providing a detailed profile of ICT adoption across the institutions. The qualitative phase included semi-structured interviews with 15 purposively selected college administrators. Each interview lasted about 45-60 minutes and explored their experiences with ICT adoption, institutional barriers, success factors, challenges such as digital literacy issues among staff and students, and attitudes toward technology in administration and education. Interview protocols ensured consistency while allowing flexibility for participants to share relevant experiences. Qualitative data were analysed through thematic analysis, a systematic method for identifying and reporting patterns in data (Braun & Clarke, 2021). The process involved six phases: first, researchers familiarized themselves with transcripts through repeated reading and noting initial thoughts; second, open coding was performed to generate initial codes directly from the data, allowing themes to emerge naturally; third, codes were grouped into potential themes by clustering related codes into categories; fourth, these themes were reviewed against the entire dataset for coherence; fifth, themes were refined, labelled, and their relationships mapped to create a coherent framework; finally, a detailed report was produced integrating selected quotes and an analytical narrative to illustrate the themes.

4.0 RESULTS AND DISCUSSION

Table 1. ICT Proficiency Level of College Administrators

Proficiency Level	Frequency (n)	Percentage (%)
Excellent	15	8.6

Above Average	49	28.2
Average	94	54.0
Below Average	14	8.0
Very Poor	2	1.2

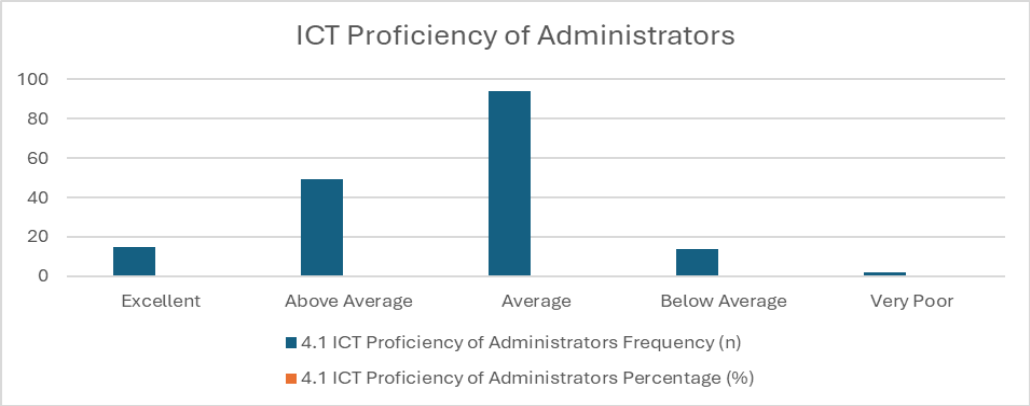

Figure 1: ICT Proficiency Level of Administrators

Different levels of ICT proficiency were reported by the administrators. Most gave their skills an average rating, indicating that they were comfortable with standard technologies like email platforms and Microsoft Office. A lower percentage assessed their proficiency with sophisticated tools like learning management systems and data visualisation software as above average or excellent. Nonetheless, a sizable percentage assessed their abilities as below average, indicating that different institutions have varying capacities.

Frequency and Purpose of ICT Use

More than 90 per cent of administrators reported using laptops and smartphones on a daily basis for record-keeping and communication. Less than half, however, stated that they regularly used ICT for research, institutional planning, or student performance analysis. This suggests a disconnect between the adoption of ICT at the most basic level and more advanced, decision-supporting applications.

Institutional Support and Policy Influence

The respondents agreed that institutional and governmental policies have a part in encouraging ICT integration. Numerous administrators cited continuous efforts to use ICT in education as facilitators. Some, however, believed that institutional policy execution was uneven, with rural colleges citing notable infrastructure shortages in comparison to their metropolitan counterparts. In an effort to assist this developing area, various governments have also developed several national policies to guarantee that ICT education gets the attention it needs. ICT integration in Ghana's educational system was made possible by the National Information and Communication Technology for Accelerated Development (ICT4AD) Policy (2015). It places a strong emphasis on leveraging ICT infrastructure and tools to improve instruction, expand access to learning materials, and help students and teachers become more proficient with

technology. National Education Strategic Plan (NESP) (2018 2030) also embedded a specific focus on ICT integration in education. It aims to ensure that ICT is fully integrated into the teaching and learning procedures across all levels of education. The plan emphasised providing ICT infrastructure, teacher training, and developing digital content and resources. Ghana's ICT in Education Policy (2019) focuses on integrating ICT into education to enhance learning outcomes, improve teaching effectiveness, and promote digital literacy. It outlines strategies for providing equitable access to ICT resources, training teachers in ICT skills, and integrating ICT into the curriculum. Ghana Digital Learning Strategy (2018-2023) was launched in 2018 to support the implementation of ICT integration in education. This strategy 18 focuses on harnessing technology to transform teaching and learning practices, expand access to educational resources, and foster digital literacy skills. It outlines the critical areas of action, including infrastructure development, teacher capacity building, curriculum alignment with ICT, and monitoring and evaluation mechanisms.

Ghana Digital Education Transformation Initiative (2020) also aimed to accelerate the integration of ICT into education through various programs and projects. It included initiatives such as distributing free laptops to teachers, developing digital content and resources, and establishing ICT laboratories in schools. Teacher Education and Professional Development are essential to effectively integrating ICT into classrooms. Ghana has tried to address this issue by implementing various programs and initiatives. For instance, the Transforming Teaching, Education, and Learning (T-TEL) Initiative, launched in 2015, focuses on enhancing teacher education and professional development practices nationwide (T-TEL, 2015). T-TEL aims to enhance teachers' capacity to integrate ICT into their teaching through targeted training and support. It is therefore important to pay attention to the continuous development of this course in Ghana.

Table 2: Barriers to ICT Adoption

Barrier	Frequency (n)	Percentage (%)
Financial Constraints	142	81.6
Inadequate Infrastructure	120	69.3
Limited Training Opportunities	95	54.6
Negative Attitudes/Resistance	78	44.8
Unreliable Internet Connectivity	110	63.2

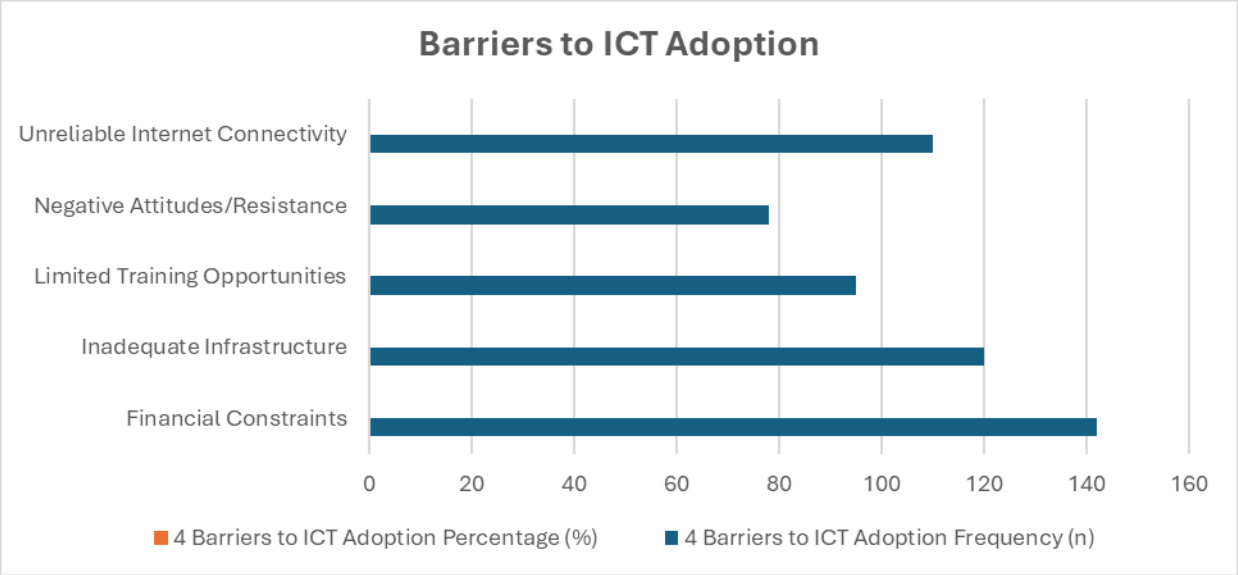

Figure 2: Barriers to ICT Adoption

The major obstacle was funding, as administrators pointed to the high cost of dependable internet connectivity, software, and hardware. Inadequate training, poor infrastructure, and lukewarm attitudes among employees who oppose technology change were further obstacles. According to Omboto et al. (2022) and Singh and Muniandi (2012), these difficulties reflect larger patterns in African higher education.

Conceptual Framework of ICT Adoption in Colleges of Education

The interaction between facilitators (training, infrastructure, and policy support), barriers (financial limitations, opposition to change), and outcomes (better institutional management, effective decision-making) is depicted in the conceptual framework (Figure 3). Administrators hold a major role as change agents, influencing the adoption and use of ICT through their leadership.

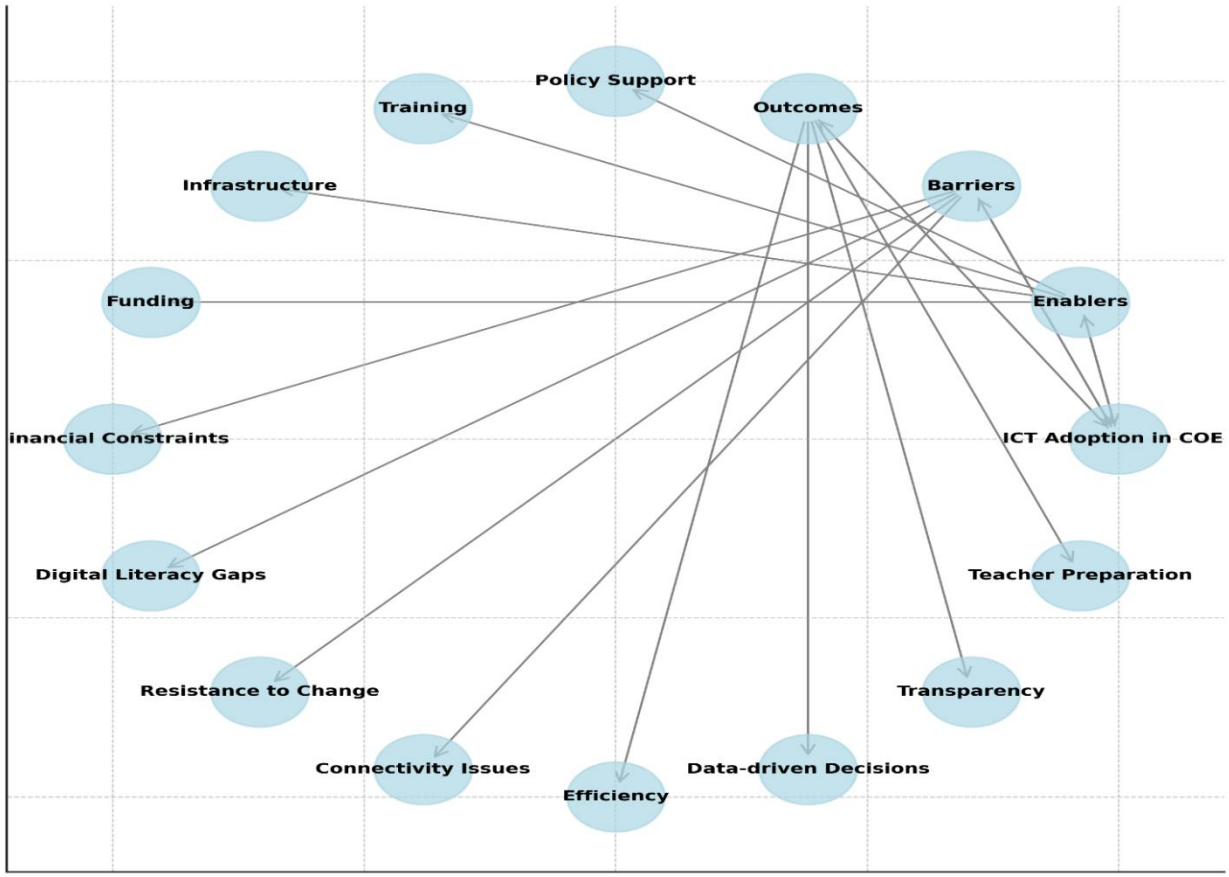

Figure 3: Conceptual Framework of ICT Adoption in Colleges of Education

Discussion

The results indicate that, although unevenly, ICT usage is increasing in Ghana's educational institutions. Although complex applications are still few, basic usage for record keeping and communication is common. This is consistent with research from Nigeria and Kenya that demonstrates comparable partial adoption trends (Kipsoi et al., 2012; Aikins & Emmanuel, 2019). The report emphasises that to effectively utilise ICT's potential, professional development, infrastructure investment, and cultural change are crucial. One important factor influencing the adoption of ICT was the attitudes of administrators. Institutions saw better adoption rates when administrators showed an openness to technology. On the other hand, integration efforts were hindered by resistance or a lack of confidence. These observations highlight the necessity of leadership development initiatives that establish college of education administrators as advocates for digital change.

The findings demonstrate that, despite being crucial for development, digital technologies are underdeveloped in Ghanaian educational institutions, which may restrict their adoption and utilisation. Wi-Fi's popularity as a tool for promoting the advancement of digital technologies has increased throughout time because of its benefits, according to Susanto et al. (2020) and Karipidis et al. (2017). According to the report, this is the case because Wi-Fi makes it possible for local area networks (LANs) to operate without the need for infrastructure or cables. Furthermore, Wi-Fi is a crucial piece of infrastructure since it allows a

wide range of modern gadgets, such as laptops, smartphones, tablets, and game consoles, to connect wirelessly to the Internet (Karipidis et al., 2017).

Considering how crucial Wi-Fi and the internet are, having bad internet quality may be quite annoying, and attempting to identify the issue can be even more time-consuming. According to Govathson et al. (2022), the router and modem utilised on these universities' campuses may have an effect on the internet connection. If Wi-Fi is being used, the equipment's placement may affect performance. The closer the router is to the computer, the better the performance is likely to be; however, this can occasionally be challenging because of the way these institutions' buildings are designed. The signal may be affected by the walls, ceilings, and flooring, especially in some older buildings, which are typical of Ghana's educational institutions. However, Hedendahl et al. (2017) contend that some gear and software, including modems, laptops, routers, and tablets, are not designed for incredibly fast data transfer, which may limit performance. Older, less effective gadgets and equipment may be the cause of your slower Internet connection. Getting new software or hardware could improve performance. It is a serious issue because this claim holds for all other types of electronic-related activities (Govathson et al., 2022).

Additionally, it was discovered that administrators have positive attitudes and opinions toward the use of technology. Furthermore, compared to their peers, administrators who completed courses in office software, educational technology, and in-service training have a more positive outlook. The results of this study were in line with other research on educationists' opinions toward new technologies in general and their integration into curricula in all educational systems, including a study by Yavich and Davidovitch (2021). Because the teachers who will be in charge of teaching the next generation and specifically spearheading these initiatives are from the age group with the most positive attitudes toward the subject, the study's practical significance lies in the necessity of continuing to lead initiatives to incorporate cutting-edge technological devices, not just tablets. According to the study, administrators' positive attitudes regarding the adoption and use of these digital technologies have a positive knock-on effect that influences funding for technological resources and encourages students to work hard to learn more about the technological field of study.

On the other hand, Mahajan (2016) contends that although college administrators seemed to have a very favourable attitude regarding the use of these digital technologies at their various educational institutions, their actual use of them in their daily routines is extremely limited, and in some cases, very scarce. The study claims that there is no proven correlation between college administrators' performance and their usage of these digital tools, which runs counter to the current study's findings.

According to the study by Cruz and Rajan (2022), the main influencing factors on administrators' attitudes toward adopting ICT are ease of use, effectiveness, time constraints, school culture, self-enthusiasm, and the growing demand for online data storage and management. The study found that the availability of technology in educational institutions is important and affects administrators' opinions regarding the use and deployment of such technologies in carrying out administrative duties. Consequently, the study established the views of educators regarding the deficiency of suitable ICT equipment and its negative impact on the use of these technologies in the classroom. At the school level, factors including infrastructure, training, support, and resources affect how easily administrators can adjust and integrate technology into their work. The professional development of staff members is crucial to the effective integration of computers into college administration.

Additionally, social and cultural factors complicate the connections between technology and administration. Social and institutional conditions often do not support administrators' efforts to integrate technology into their work. Since educational technology was in a very different state when administrators obtained their degrees, they often lack the training or knowledge needed to use digital technologies when teaching and learning, as well as administration (Ilomäki & Lakkala, 2018). According to Ilomäki and Lakkala (2018), it is therefore not surprising that they do not think they are sufficiently prepared to use technology and often do not see its significance or value for management, as well as teaching and learning. Learning new things can be challenging, particularly if they take a lot of time and need to be incorporated into a busy schedule. Furthermore, it is unlikely that administrators will employ this information unless they can find technology applications that align with their preexisting educational beliefs (Viberg et al., 2020). Administrators have also frequently received inadequate training for their positions, which has limited their comprehension. Although instructors operate in a range of teaching and learning situations, many professional development programs for administrators adopt a one-size-fits-all strategy when it comes to integrating technology (Redmond & Lock, 2019).

Ryan and Bagley (2015) state that two main factors, manipulative and non-manipulative, have an impact on how well ICT technologies are implemented and used in different educational institutions. The study found that the non-manipulative factors are typically ascribed to the characteristics of teachers, including their educational background, age, gender, and experience, as well as their financial situation and familiarity with using computers and ICT for teaching. According to Tokareva et al. (2019), family and community support is another non-manipulative element influencing the efficient use of ICT technologies. According to the study, schools can shift to ICT that is student-centred by establishing relationships with the broader community. These links enable the development of a more contextualised, authentic, and ICT-supported approach to administration and learning (Atman Uslu & Usluel, 2019). Therefore, in order to meet the needs of effectively and efficiently adopting technologies, the community's human obligations, roles, and priorities must be rearranged (Tokareva et al., 2019). Each of these elements contributes in different ways to the efficient use of technology. As a result, Mirzajani et al. (2016) add that raising teachers' ability to use ICT for instruction necessitates principal and administrator support, partnerships and collaboration between educators and organisations, information sharing among teachers, and long-term, continuous development of the lead trainers. However, according to Voogt and McKenney (2016), an ICT master plan that is developed in line with a school's vision and sociocultural milieu ensures ICT integration. According to the report, some factors that should be considered are curriculum and assessment, ICT facilities and resources, technical, administrative, and pedagogical support teams, and the development of staff and student ICT-related skills. Consequently, an ICT integration plan provides a comprehensive overview of the steps and tactics needed to achieve the school's ICT objective. Although developing ICT integration methods is a challenging and time-consuming task, the work is usually well worth it (Mirzajani et al., 2016). According to Voogt and McKenney (2016), these interventions are necessary to address issues including inadequate internet access, a lack of motivation on the part of tutors and students to use ICT tools, and a lack of incentives to incorporate ICT tools into teaching and learning.

According to the study's findings, administrators at the chosen schools of education typically use mobile devices regularly to facilitate communication amongst administrative staff across the various campuses. The use of cellphones on campuses is one feature that sets 21st-century universities apart. The way that classroom and school regulations are implemented has changed significantly to modernise the teaching

and learning process for both teachers and students. This has also been augmented by the advent of mobile devices, which are helpful teaching aids for effective classroom communication. Osakwe et al. (2017) state that technical improvements have led to a rise in the use of mobile technology in the education sector, particularly at the tertiary level. The idea that technology is having an expanding impact on the higher education sector is further supported by the fact that many institutions worldwide are experimenting with various teaching methods and integrating mobile phones to help students learn.

According to Farrah and Abu-Dawood (2018), mobile and ICT-related technologies present several chances to create, implement, and encourage innovative teaching strategies. The study further shows that these technologies can also be utilised to improve collaboration and communication, creative and interactive learning styles, and the creation of tools and applications to help with the delivery of educational content. Therefore, institutions such as the colleges of education in Ghana must carefully balance technology investments made against the advantages enjoyed by students and administration in implementing such technologies in the learning environment. The adoption of new technologies might bring up a unique set of problems unique to each organisation, regardless of its sector of operations. This can entail significant outlays of money and resources in order to obtain prospective gains (Van Vo & Thuy Vo, 2020).

In the viewpoint ofIglesias Rodríguez et al. (2017), the use of mobile devices can be thought of as an all-in-one strategy that delivers the benefits of context-based, individualised, socially engaged, and multidisciplinary approaches to learning and management. Additionally, given the ongoing technological advancements and the expanding usage of digital tools, such approaches are thought to be particularly applicable for use in virtual learning environments set up by lecturers and administrators. As a result, they are essential for developing innovative administrative strategies for college administrators. In the view of Soad et al. (2016), mobile phones have evolved from being seen as classroom distractions to becoming tools that assist in teaching, managing, and supporting students. Using cell phones as educational tools offers several advantages, such as improved learning outcomes, increased student engagement, and a simpler way to keep students informed about assignments and records management. To ensure these devices are properly used in schools, teachers must plan accordingly, just like with any other equipment.

The ICT skillset of administrators at various colleges of education was found to be high in this study. According to Lokpo and Kumah (2023), this is because nearly every aspect of our modern civilisation has been influenced by technology, and the education sector is no exception. Technology enables the achievement of much more than was possible a few decades ago; therefore, it becomes vital for teachers and other stakeholders to incorporate technology knowledge and skills into their professional development and teaching practices (Lokpo & Kumah, 2023). The study argues that teachers need to have a specific level of proficiency in different technology domains to perform effectively today, which explains the high levels of ICT skills and the growing proficiency among tutors in the selected colleges of education in the Ashanti region. Nye (2014) adds that developing these skills impacts how administrators manage their work, grow personally and professionally, and ultimately, how their schools improve. Every administrator requires a certain level of ICT proficiency across various subjects.

Lubuva et al. (2022) share the belief that the current educational landscape is changing quickly because of technological advancements, and for schools, this transition presents a chance to leverage contemporary technology to promote inspirational learning. The study asserts that a lot of administrators need to keep

up and build up their knowledge base of the various ICT-related tools since the students and staff they relate with are frequently more technologically proficient and abreast with the current trends of technologies in society.

It is believed that a lack of funding is the primary cause of insufficient ICT training, according to Dankers et al. (2022). The fact that administrators are worried about falling behind without consistent upskilling is concerning, especially in cases when they are comfortable using current technology due to mandated cost savings. Furthermore, since educational technology is essential to ensuring that children from all socioeconomic backgrounds have the same opportunity to succeed, any decrease in its use could worsen the wealth gap in schools that are already strapped for funds. It is therefore essential, in the case of the colleges of education in Ghana, to access means and opportunities to continually grow the knowledge base of its administrators and expand their level of proficiency in the subject area. This is especially relevant as administrators are only able to effectively integrate technology in their deliveries and instructions if they themselves are knowledgeable about the technology (Benjamin Aidoo et al., 2022). The onus, therefore, lies on college administrators to make room for enough funding to train, motivate, and acquire modern technological infrastructure to support the day-to-day running of the various colleges of education.

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion: The adoption of ICT in Ghanaian educational institutions is at a turning point. ICT integration for basic management and communication has improved significantly, but sophisticated, evidence-based applications are still underutilised. According to the study's findings, administrators are essential in closing this gap. Institutional preparedness for digital transformation is directly impacted by their leadership styles, abilities, and attitudes.

Recommendations: Based on the findings of this research, it is recommended that state agencies such as the government, the Ministry of Education, and the Ghana Tertiary Education Commission (GTEC) take necessary steps towards bridging the gap in ICT between the rural and urban institutions and to lessen the digital divide, improve ICT infrastructure, and make targeted investments in rural colleges of education. Extend professional development initiatives that incorporate instructional design, data analysis, and strategic planning on top of technical training. And also, create long-term funding sources to encourage ICT adoption, such as public-private partnerships, and encourage a digital culture that encourages innovation, teamwork, and experimentation in administration and instruction. Lastly, guarantee coherence and scalability, match national policy frameworks with institutional ICT initiatives.

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