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RESEARCH ARTICLE

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Technology Accessibility and Confidence: A Comparative Study of Public and Private Basic Schools

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Abstract: This study examined ICT accessibility and the confidence levels of basic school teachers in using digital tools for teaching in the Awutu Senya District of Ghana. The study further sought to find the differences in public and private schools in terms of technology accessibility and teacher confidence in using ICT tools for teaching. A multi-stage sampling was used to select 350 teachers for the study, which employed a descriptive survey design. The study employed a mixed-method approach, where data was gathered through the administration of questionnaires and analyzed using statistical measures such as means, standard deviation and independent samples t-test. Additionally, 70 teachers were purposively selected from the larger sample of 350 to be interviewed, providing qualitative insights to complement the quantitative data. The results showed that there is low technology accessibility in most of the schools. That notwithstanding, the confidence level of most teachers in the use of ICT tools for teaching was moderate. A significant difference was found between public and private schools in terms of technology accessibility but not in the confidence of teachers to use digital tools. The study recommended that teachers should employ various strategies including the use of "one-computer classroom" strategy to integrate ICTs into their teaching in spite of the lack of resources. Additionally, more ICT integration workshops must be organized in a bid to increase the confidence level of teachers in using digital tools. Finally, public-private partnerships, including NGOs, can help supplement ICT resources and expertise.

Keywords: Basic School teachers, Technology accessibility, teacher confidence, public and private schools, educational technology

INTRODUCTION

Globalization and rapid technological advancements over the past fifteen years have created a knowledge-driven global economy. This economy increasingly relies on digital tools, access to information, and continuous learning. These changes have significant implications for education, requiring a shift in the role of educational institutions. As information rapidly becomes outdated, schools must go beyond transmitting fixed knowledge and instead promote lifelong learning. This shift is critical, as individuals must continuously acquire new knowledge, unlearn obsolete information and adapt to evolving learning methodologies (Smulovics, 2023). The successful integration of Information and Communication Technology (ICT) into education is widely recognized as a fundamental pillar of this transformation. However, despite its potential, research indicates that many teachers hesitate to incorporate ICT into their instructional practices, not due to a lack of pedagogical understanding but because of their limited proficiency in using digital tools effectively (Mrosso & Ndibalema, 2024). Studies

further reveal that inadequate training in computer and internet use prevents educators from adopting innovative teaching approaches that could enhance learning outcomes (Althubyani, 2024). Additionally, Abedi and Ackah-Jnr (2023) identified limited ICT competency as a major barrier to internet use in primary schools, reinforcing the argument that accessibility alone is insufficient and that teachers' ability to confidently utilize ICT resources is equally critical, as Pierce and Cleary (2024) argued. In the Ghanaian context, ICT accessibility and teacher confidence present even greater challenges. Disparities in ICT access between rural and urban schools, as well as between public and private institutions, create unequal learning opportunities, largely due to inadequate funding, poor infrastructure and insufficient teacher training (Afzal, Khan, Daud, & Ahmed, 2023; Ali, Ashraf, & Yasmin, 2020). In societies such as Awutu Senya District in Ghana, these disparities may lead to a digital divide in instructional practices, potentially affecting student learning outcomes. Understanding these dynamics is crucial for designing targeted interventions to bridge the gap between ICT availability and its meaningful integration into teaching and learning.

Research Problem

In spite of efforts being made by government, NGOs, political actors and other stakeholders, there are reports of poor ICT integration in basic schools in Ghana. It was observed by Ibrahim, Nantomah, and Inusah (2022) that most schools in Ghana only teach ICT skills and not how to fully incorporate ICT tools into the curriculum. Several studies (Soma, Nantomah, & Adusei, 2021; Donkor, 2024; Boye, 2024; Africa Education Watch, 2024; Lomo, Abonyi, & Ahwireng, 2024) report inadequate ICT facilities in Ghanaian schools. Even where resources exist, teachers often struggle to integrate them effectively due to insufficient training and low digital confidence. This gap in pedagogical ICT integration limits the full benefits of technology in education, making it essential to examine both accessibility and teacher readiness. Soma et al. (2021) reported that many basic schools in Ghana lack the necessary ICT facilities, including computer labs. This deficiency hinders ICT integration into the curriculum (Ayebi-Arthur, Korsah, Abudulai, Birago, & Boafo, 2023). Burns (2023) found that despite teachers' strong interest in ICT integration, several challenges hinder its implementation. The key barriers include low confidence, inadequate training, and limited access to ICT resources. Existing research highlights the persistent lack of ICT tools in basic schools across Ghana (Soma et al., 2021; Donkor, 2024; Boye, 2024). However, it appears no study has been specifically conducted to look at the technology accessibility and teachers' confidence to use ICT tools in both public and private basic schools. This study addresses a critical research gap by examining how ICT accessibility and teacher confidence jointly influence technology adoption in basic education, focusing on public and private schools in the Awutu Senya District.

Research Questions

1. To what extent do basic school teachers integrate ICT tools into their teaching and learning practices?
2. To what extent are ICT resources available in basic schools?
3. What is the confidence level of teachers in using ICT tools in teaching at the basic schools?

Hypotheses

1. $H0_1$: There is no significant difference in ICT accessibility between public and private basic schools.
2. $H0_2$: There is no significant difference in teacher confidence in using ICT tools between public and private basic schools.

LITERATURE REVIEW

Access to Information and Communication Technologies (ICTs) and the Digital Divide

ICT has the ability to serve as a very effective facilitator for driving educational transformation and implementing changes. According to Global Education Monitoring (2023), the utilization of various ICTs has the potential to enhance educational accessibility, increase the applicability of education in the evolving digital work environment and improve educational standards by fostering interactive and engaging teaching and learning experiences that are connected to real-world contexts. Today, teachers worldwide are encouraged and expected to integrate ICTs into teaching and learning due to its numerous benefits. The growth of ICT in all areas of human endeavor is currently transforming the word "illiteracy" as no more inability to read and write but the inability to "learn, unlearn and relearn" in the modernized world. In fact, with the onset of computers in education, teachers are able to impart knowledge easier and learners learn faster. According to the findings of Gil-Flores, Rodríguez Santero, and Ortiz de Villate (2024), the availability of technological resources has been identified as a significant factor in facilitating teachers' application of ICT in their instructional practices. However, mere access to ICT resources does not automatically translate into effective utilization. A critical analysis of this study within the Ghanaian context suggests that while public schools may receive ICT resources, their impact is often diminished due to limited training and low digital confidence among educators, making accessibility only one part of the equation. Similarly, Olita and Orong (2023) also opined that the lack of accessibility to ICT resources is not solely attributed to the absence of hardware, software or ICT materials within educational institutions. It can also be attributed to inadequate resource management, substandard hardware or unsuitable software. Lagarbe (2024) asserts that the presence of ICT infrastructure and resources within educational institutions is an essential prerequisite for the successful incorporation of ICT in the field of education. The successful integration of the internet into educational settings is contingent upon the presence and ease of access to ICT resources, including hardware and software components. It is evident that if ICT resources are absent in schools, teachers will not integrate

them into their lessons. Hence, the availability of computers, up-to-date software, and hardware components is a crucial factor for effectively harnessing the potential of ICT use. In Ghana, despite the government's effort to furnish all levels of education with ICT resources, there is a prevailing perception that many schools, particularly those situated in rural regions, lack sufficient ICT resources (Boye, 2024). The digital divide, which refers to the disparity in access to computers and internet amongst institutions, is indeed a tangible issue among basic schools in Ghana. Schools in urban areas are also perceived to be on the brighter side of the digital divide while their counterparts in the rural settings do not have much access to ICTs. Talaee and Noroozi (2019) provide further insight into this divide, arguing that digital inequalities are more influenced by economic, social and cultural factors within the home environment rather than mere physical access to ICT tools. In the Ghanaian context, Talaee and Noroozi's (2019) argument is particularly relevant, as disparities in ICT adoption are not solely due to the availability of devices in schools but are also shaped by socioeconomic inequalities. Many students from low-income households, especially in rural areas, lack exposure to digital tools at home, limiting their ability to develop essential ICT skills even when such resources are available in schools. Additionally, cultural perceptions about technology, such as parental skepticism or limited digital literacy among guardians, further contribute to the digital divide, reinforcing disparities in ICT proficiency among students. Research by the Ghana Statistical Service on Digital Exclusion in Ghana noted that one in every three children (35.2%) currently attending school did not use an ICT device. Additionally, "four in every ten children (41.5%) currently attending school did not access the internet" (Ghana Statistical Service, 2023, p. 31). Another research by Africa Education Watch, an education policy research and advocacy organization note that as of 2023, only 15% of public primary schools, 13% of public Junior High School (JHS) schools had access to functioning ICT facilities (Donkor, 2024).

Bridging the Digital Divide in Ghanian Schools: The Impact of Computer Donations by NGOs and Political Actors

To address the lack of ICT access that persist in many schools in Ghana, non-governmental organizations (NGOs) and some political actors have stepped forward to donate computers to schools, playing a crucial role in bridging the digital divide. The significance of a few of such donations are examined. In August 2024, the member of parliament for Awutu Senya West, Hon. Gizella Tetteh-Agbotui donated an HP server to Senya Senior High School. This donation was made in response to a request from the school to revitalize the existing ICT lab, and to allow students access to shared data, computer programs and other resources (Odoom, 2024). In another setting, the Consolidated Bank Ghana Ltd (CBG) donated 30 computers to 3 Junior High Schools in Agona in the Ashanti Region. The schools include Agona SDA JHS, Bedomase D/A Basic School and Bipoa JHS. The initiative, was intended to help

bridge the digital divide and help students succeed in the world of technology (Narh, 2024). In August 2019, Hon. Kofi Adams, MP for Buem Constituency provided desktop computers to schools in the constituency. The beneficiary schools, Oseikrom D/A Basic School and Jasikan R/C Basic School, received 18 and 20 computers and accessories, respectively. This, he said was to ensure that pupils get hands-on experience in the study of ICT (Myjoyonline, 2019). While NGOs and political actors play a role in providing ICT resources, sustainable integration requires supportive policies and government intervention, as discussed in the next section.

Impact of Government Policies and Educational Reforms on the ICT Landscape in Ghana

Government policies and educational reforms have significantly influenced the ICT landscape in Ghana, shaping accessibility, infrastructure development and teacher training. The introduction of the ICT for Education Policy (ICT4E), Smart Schools Project and initiatives like "One Teacher, One Laptop" have aimed to integrate technology into education. However, public schools, especially in rural areas, still face challenges due to inadequate infrastructure, inconsistent implementation, and limited teacher training. The digital divide remains a concern, with private schools often having better access to ICT resources than public institutions. To ensure equitable educational technology use, the government must improve policy execution, enhance teacher capacity-building programs, and invest in sustainable infrastructure to bridge the digital gap in education.

Teacher Confidence in Using ICT Tools

Multiple studies have indicated that a significant obstacle impeding teachers' incorporation of ICT technologies in their instructional practices is lack of confidence (Abedi & Ackah-Jnr, 2023; Aureza & Emaliana, 2023; Education Business, 2022). This factor poses a significant obstacle to the integration of ICT by educators within the classroom. Several research papers have examined the factors contributing to teachers' limited confidence in utilizing ICT. According to the findings of a research conducted by Akaadom and Gorni (2023), as well as Aikins and Arthur-Nyarko (2019), a significant number of teachers in Ghana exhibit a lack of confidence when it comes to utilizing ICT resources within their educational settings. These studies emphasized that educators frequently experience a sense of insufficient training and lack of readiness when it comes to properly using technology into their teaching practices. Teacher confidence levels are also influenced by gender differences. According to a study conducted by Buabeng-Andoh (2015), male teachers in Ghana exhibit a higher level of confidence in utilizing ICT tools in comparison to their female counterparts. This disparity can be attributed to several factors. Cultural expectations in Ghana, and many other societies, often position men as more inclined toward technology-related fields, leading to greater encouragement and exposure to digital tools from an early

age. Additionally, male teachers may have had more opportunities to engage with ICT due to societal norms that historically favored men in STEM-related careers. Access to technology is another critical factor. Female teachers, particularly in rural areas, may have fewer chances to practice ICT skills due to household responsibilities and limited institutional support. Furthermore, differences in training opportunities contribute to this gap; some studies suggest that ICT training programs may unintentionally be more accessible to male teachers due to scheduling conflicts or recruitment biases that do not account for gender-based constraints (Golloh, 2023).

Addressing these disparities requires targeted ICT training initiatives that actively encourage female teacher participation, ensuring equitable access to technological resources and skill development. Conversely, teachers that exhibit confidence in employing technological tools within their instructional settings possess a comprehensive understanding of the efficacy of ICT (Garzon & Garzon, 2023). According to the findings of Clipa, Delibas, and Mâță (2023), teachers who possess a strong sense of confidence in utilizing ICT acknowledge the utility of these technologies in both their instructional practices and personal endeavors. Furthermore, these teachers express a desire to expand their utilization of ICT in the future. A number of key actions can be taken to increase teachers' confidence in using ICT tools. First, implementing and expanding comprehensive ICT programs for teachers to enhance their knowledge should be prioritized (Ngina, 2024). These programs should cover not only the technical aspects of using ICT tools but also focus on pedagogical integration, helping teachers understand how to effectively incorporate technology into their teaching methods. These training should be fine-tuned in a manner that would help teachers to integrate ICT into teaching successfully (Abedi, 2024). Secondly, ongoing professional development opportunities must be offered to teachers to keep them updated with the latest ICT tools and teaching methodologies. These programs can include workshops, seminars, webinars and online courses. Teacher knowledge, skill, and practice can all be enhanced through professional development, which in turn benefits students and the profession as a whole (Saderholm, Ronau, Rakes, Bush, & Mohr-Schroeder, 2023). Lastly, institution of peer learning communities among teachers where they can collaborate, share experiences, and exchange best practices related to technology adoption will go a long way to increase the confidence level of teachers. These communities can provide a support system for teachers seeking to enhance their ICT skills. All the professionals in the school community can learn from each other, and the goal is to improve student learning through professional learning communities (Germuth, 2018).

The Role of Self-Efficacy in ICT Integration

A key determinant of effective ICT adoption in education is teacher confidence, which is closely linked to Self-Efficacy Theory (Bandura, 1977). Self-efficacy refers to an individual's belief in their ability to successfully execute tasks in a specific domain. Applied to ICT integration, teachers who possess high

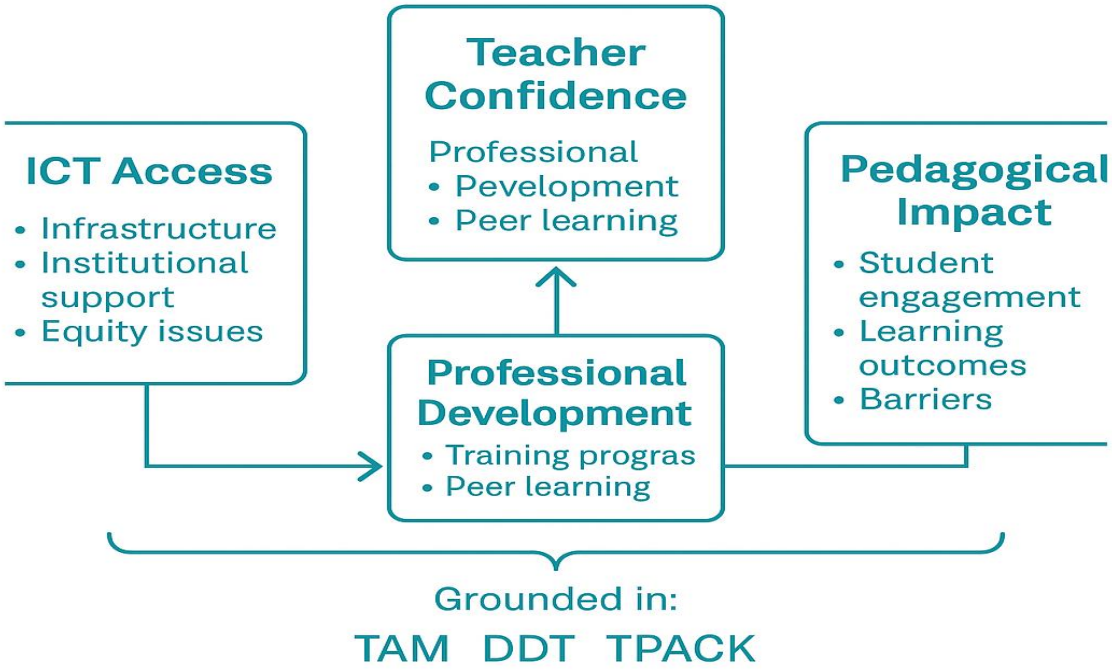
self-efficacy are more likely to experiment with digital tools, overcome technological challenges and integrate ICT into their pedagogy effectively. In contrast, those with low self-efficacy may resist ICT use due to anxiety, fear of failure or lack of exposure. Bandura (1977) outlines four primary sources that shape self-efficacy: mastery experiences, social modeling, social persuasion and emotional states. In the Ghanaian educational landscape, limited mastery experiences due to restricted access to ICT tools can diminish teachers' confidence in using technology. Additionally, the absence of social modeling where teachers observe and learn from ICT-proficient colleagues further impedes skill development. Without adequate training and encouragement (social persuasion), many teachers may develop a negative attitude toward ICT, reinforcing a cycle of underutilization. Moreover, the emotional stress associated with navigating unfamiliar technology may discourage educators from adopting digital resources, particularly in public schools where institutional support is often weaker. Despite extensive research on ICT integration, limited studies have examined how both ICT accessibility and teacher confidence interact to influence digital adoption, particularly in the Ghanaian context.

Given these challenges, it is essential to understand how ICT accessibility and teacher confidence intersect to shape digital adoption in education. This study provides empirical insights into this relationship, offering a comparative analysis of public and private schools. By conducting a comparative analysis of public and private schools, we seek to highlight existing disparities, identify underlying causes and propose strategies to enhance digital inclusion in Ghana's educational system. Through a comprehensive investigation of ICT access and teacher self-efficacy, this research aspires to contribute to ongoing discussions on digital transformation in education. The findings will offer practical recommendations for policymakers, school administrators and teacher training programs to address digital competency gaps. By addressing both technological barriers and psychological determinants, we aim to support educators in harnessing ICT effectively, ultimately preparing learners for 21st-century digital literacy and global competitiveness.

Conceptual Framework

The conceptual framework for this study explores the interconnected relationships between ICT access, teacher confidence, and pedagogical impact in public and private schools. Grounded in the Technology Acceptance Model (TAM), Digital Divide Theory (DDT) and Technological Pedagogical Content Knowledge (TPACK) frameworks, (Davis, 1989; Mishra & Koehler, 2006; van Dijk, 2006), this research examines how variations in technology accessibility influence teachers' ability and willingness to integrate ICT into their teaching practices. ICT access, shaped by infrastructure, institutional support and equity issues, plays a crucial role in determining teachers' technological proficiency and confidence. Additionally, professional development opportunities, such as training programs and peer learning, mediate this relationship by enhancing teachers' perceived ease of use and usefulness of ICT tools. As

teacher confidence grows, the effective integration of ICT into pedagogical practices improves, leading to enhanced student engagement and learning outcomes. However, barriers such as resistance to change, technical challenges and inadequate training can limit this process. The framework suggests that higher ICT access, particularly in private schools with better resources, fosters stronger teacher confidence, which in turn improves instructional methods. Ultimately, the level of technology adoption within classrooms shapes student participation, motivation and academic performance, emphasizing the need for equitable technological access and ongoing professional development to bridge gaps between public and private educational institutions.



METHODOLOGY

Research Design

The study employed a descriptive survey design. According to Hassan (2024) a descriptive survey design facilitates the identification and documentation of phenomena in a natural manner, aiming to portray observable behaviour, attitudes, ideals and traits. Additionally, Creswell (2018) notes that a descriptive survey design is useful for systematically collecting and analyzing data to understand patterns and relationships within a population. Similarly, Saunders, Lewis, and Thornhill (2019) emphasize that descriptive research enables the exploration of variables without manipulation, ensuring that findings accurately reflect real-world conditions. This aligns with the present study's objective of assessing variations in ICT accessibility and teacher confidence across different schools. A descriptive survey design was appropriate for this study because it allows for the systematic collection of data on

participants' perspectives and experiences in a structured manner. This approach enables researchers to gather quantifiable information from a large population, making it effective for assessing variations in ICT accessibility and teacher confidence across different schools. Additionally, the design supports the exploration of relationships between key variables without manipulation. This ensures that the findings accurately reflect the real-world conditions of ICT readiness and usage in basic schools. By utilizing this method, the study provides reliable insights into the current technological landscape and teachers' preparedness, thereby informing future policy and intervention strategies.

Participants

The population for the study comprises all basic school teachers at Awutu Senya District, totaling 1,164 teachers (Ministry of Education, 2023). A multi-stage sampling technique was employed to ensure a representative selection of respondents. In the first stage, convenience sampling was used to select 82 schools, comprising 41 public schools and 41 private schools. This selection was based on the availability of teachers and their willingness to participate in the study during workshops organized by the District Education Directorate. This selection ensured balanced representation across different school types. From these schools, purposive sampling was then employed to identify 578 JHS teachers from the four categories of teachers (Crèche & Nursery, Kindergarten, Primary and JHS). This selection was aimed at assessing ICT accessibility and teacher confidence in integrating technology into teaching.

In the third stage, a stratified random sampling technique was used to select 350 teachers from the 578 JHS teachers. The stratification was based on subject specialization, ensuring proportional representation across different examinable subjects recognized by the West African Examinations Council (WAEC). The selection of 350 teachers was based on statistical sampling principles to maintain a representative yet manageable sample size. According to Krejcie and Morgan's (1970) sample size determination table, for a population of approximately 1,200, a sample size of around 285 to 291 is recommended. By selecting 350 respondents, the study ensures a sufficiently large sample for generalizability while minimizing potential errors. The sample distribution included Mathematics (N=72), English (N=88), Ghanaian Language (N=29), French and Arabic (N=21), Science (N=57), Creative Arts and Design (N=43), Religious and Moral Education (RME) (N=18), and Computing (N=22). This stratification ensured that subject-specific perspectives on ICT access and confidence were adequately captured, providing a balanced and diverse dataset for analysis.

Data Collection

A questionnaire and interview guide were used to collect data. The self-developed, structured questionnaire was divided into four sections: A, B, C and D. Section A gathered background information, including details such as gender, educational qualifications, teaching experience, and the type of school

in which the respondent teaches. Section B focused on ICT usage, exploring the frequency of ICT integration in teaching, commonly used tools such as projectors and educational apps and the challenges teachers face when incorporating technology into their lessons. Section C examined technology accessibility by assessing the availability of ICT resources, the presence of technical support and the extent to which infrastructure challenges hinder access to digital tools. Section D measured teacher confidence in ICT use, investigating aspects such as self-reported confidence levels, prior training in ICT for education and the ability to troubleshoot basic technical problems in the classroom. The questionnaire was developed based on the study's objectives and a thorough literature review and was reviewed by an expert in ICT Education to ensure face and construct validity. To further enhance its reliability, the instrument was pre-tested in a school with similar characteristics to the sample population. The reliability of the subscales was tested using Cronbach's coefficient alpha, yielding values of 0.72 for ICT usage, 0.87 for confidence level, and 0.86 for technology accessibility, indicating strong internal consistency. The questionnaires were then administered to participants by two of the researchers. Prior to data collection, informed consent was obtained from all respondents, who were assured that their participation was voluntary and that they could withdraw at any time without consequences. Confidentiality was strictly maintained, and no personally identifiable information was collected, ensuring the anonymity and privacy of all participants. The data collected was used solely for research purposes and stored securely to prevent unauthorized access.

In addition to the questionnaire, a semi-structured interview guide was developed to gain deeper insights into teachers' experiences with ICT accessibility and confidence in public and private schools. The interview guide was designed to complement the quantitative data by exploring teachers' perceptions, challenges, and contextual factors influencing ICT integration in their schools. The guide consisted of open-ended questions divided into three main sections. The first section focused on teachers' general experiences with ICT, including the types of digital tools they use and their frequency of use. The second section explored barriers to ICT accessibility, such as infrastructure limitations, technical support availability, and school policies affecting technology adoption. The final section examined teacher confidence, assessing their comfort levels in using ICT, prior training received, and strategies they employ to overcome technological challenges in the classroom. Similar to the questionnaire, the interview questions were developed based on the study's objectives and a review of relevant literature to ensure alignment with key themes. To establish content validity, the guide was reviewed by an expert in ICT Education, and a pilot interview was conducted with a small group of teachers outside the study sample. This process helped refine the questions for clarity and relevance. The interviews were conducted in a flexible manner, allowing participants to elaborate on their responses while ensuring consistency across interviews. All interviews were recorded with participants' consent and later transcribed for thematic analysis.

Data Analysis

Quantitative data were analyzed using descriptive statistics, including means and standard deviations, as well as inferential statistics, specifically the independent samples t-test, to compare differences between groups. For qualitative data, thematic analysis was employed to identify patterns and key themes within the interview responses. This process involved transcribing the data, coding responses, categorizing emerging themes and interpreting findings in relation to the study's objectives. Thematic analysis ensured a structured and systematic examination of qualitative insights, providing depth to the quantitative findings.

RESULTS AND DISCUSSIONS

This part deals with analysis of the questionnaire and interviews. The results of the questionnaire are displayed in three sessions. The first part displays the demography of the respondents, the second shows the result of the research questions and the third presents hypotheses results. Finally, the interview responses are systematically presented and analyzed.

Research Question 1: To what extent do basic school teachers integrate ICT tools into their teaching and learning practices?

A number of questions were asked to answer this research question. The results are displayed from Tables 1 to 3.

Table 1: Teachers' Utilization of ICT Tools in Teaching

Use of ICT Tools	Frequency	Percentage
Yes	303	86.5
No	47	13.5
Total	**350**	**100.0**

According to the data presented in Table 1, a majority of teachers, specifically 86.5%, reported utilizing ICT tools for teaching purposes, while a smaller proportion, 13.5%, indicated that they do not incorporate ICT tools into their instructional practices. These findings suggest a widespread adoption of ICT in teaching, reflecting a positive shift toward technology-enhanced pedagogy. The high percentage of ICT usage among teachers may be attributed to increasing efforts to integrate technology into education, as supported by government policies and institutional initiatives promoting digital literacy. Additionally, teachers' use of their mobile devices for teaching and research may contribute to this outcome.

The findings align with previous research, which emphasizes the transformative impact of ICT tools on teaching and learning. Studies by Bicalho, Coll, Engel, and Oliveira (2022), Haarala-Muhonen, Myyry, Pyörälä, Kallunki, Anttila, Katajavuori, Kinnunen, and Tuononen (2023) and Clipa et al. (2023) highlight that ICT integration enhances not only instructional effectiveness but also student engagement and motivation. Teachers who actively use ICT tools benefit from improved lesson delivery, better visualization of concepts and access to a wider range of digital resources, fostering more interactive and student-centered learning environments. However, the presence of teachers who do not utilize ICT tools suggests potential barriers such as limited access to technology, lack of training or resistance to change, which have been widely discussed in ICT adoption literature. Addressing these challenges through targeted professional development programs and infrastructure improvements could further increase ICT utilization and maximize its benefits in education.

Table 2: Teachers' Utilization of the Internet for Research and Instruction

Use of Internet	Frequency	Percentage
Yes	237	67.6
No	113	32.4
Total	**350**	**100.0**

According to the data displayed in Table 2, it can be inferred that a majority of teachers, specifically 67.6%, utilize the internet as a tool for research and instructional purposes. Conversely, a smaller proportion of teachers, specifically 32.4%, reported not including the usage of internet in their teaching practices. This finding indicates that a majority of basic school teachers incorporate the usage of the internet as a pedagogical tool in their instructional practices, highlighting the growing importance of internet access in the modern classroom. This aligns with recent research, which found that a good number of teachers integrate ICT in one form or the other in their pedagogical practices, with the use of the internet being a critical component of this integration (Bicalho et al., 2022; Clipa et al., 2023). These findings show that while the majority of teachers accept the internet as a tool for teaching, a significant minority might either have challenges in accessing the resource or do not want to use the resource.

Table 3: Frequency of Teachers' ICT Tool Usage

Frequency of ICT Use	Frequency	Percentage
Often (twice or more in a week)	57	16.2
Very Often (everyday)	76	21.6
Rarely (once in several months)	142	40.5
Sometimes (once or twice in a month)	66	18.9
Not at All	9	2.7
Total	**350**	**100.0**

The results presented in Table 3 provide insight into the frequency with which teachers integrate ICT tools into their instructional practices. The data indicate that 16.2% of teachers often use ICT tools, meaning they incorporate them at least twice or more per week, while 21.6% report using ICT tools very often, on a daily basis. These figures suggest that a considerable portion of teachers are actively engaging with technology in their teaching. However, a substantial number of teachers (40.5%) reported rarely using ICT tools, meaning they only use them once in several months, and 18.9% stated they use ICT tools sometimes, approximately once or twice per month. Notably, 2.7% of teachers do not use ICT tools at all, highlighting the presence of educators who have yet to adopt technology in their teaching.

To address Research Question 1, while ICT tools are utilized by a majority of teachers, their usage frequency remains relatively low. This aligns with previous studies, such as those conducted by Mlinarević, Tokić Zec, and Cvjetičanin (2022) and Goktas, Kucukkaya, and Karacay (2023), which suggest that despite increasing ICT accessibility, many teachers still struggle with consistent integration due to factors such as inadequate training, lack of infrastructure, or personal reluctance toward technology. Additionally, the high percentage of teachers who rarely use ICT tools suggests that while some schools may have access to technology, actual classroom implementation remains inconsistent. These findings highlight the need for more targeted professional development programs and institutional support to encourage frequent and effective ICT use in teaching, as supported by research from Law, Lei, Zhang, and Lau (2023), which emphasizes the role of ongoing training and resource availability in promoting technology integration.

Research Question 2: To what extent are ICT resources available in basic schools?

To answer Research Question 2, data was collected on the Technology Accessibility in schools and the results presented in Table 4. The mean scores interpretation, as suggested by Zaki and Ahmad (2017) is as follows: 0-1.89 = very low, 1.90-2.69=low, 2.7-3.49=moderate, 3.5-4.2 = high and 4.30-5.00.

Analysis of Table 4 shows that technology accessibility in the various schools is on the low side. The findings on technology accessibility indicate that respondents generally perceived ICT resources in their schools as inadequate. This is particularly evident in the case of educational software, which had a low mean score of 1.6486, suggesting that such resources are either unavailable or insufficiently provided. Similarly, interactive whiteboards (mean = 1.00) were found to be entirely lacking, while ICT tools designed for children with disabilities, such as braille keyboards, typing aids and talking calculators, also had a low mean score of 1.524, highlighting a significant gap in inclusive technology provision. The availability of scanners (mean = 1.6486) was also reported as minimal, further reinforcing the challenges faced by schools in integrating ICT tools into teaching and learning.

Table 4: Technology Accessibility in Basic Schools of Awutu Senya District

S/n	Item on School Technology Accessibility	Mean	SD	Interpretation
1	There are enough computers in my school (desktops and laptops)	2.29	0.06	Low
2	My school has enough educational software for teaching various subjects	1.64	0.16	Very Low
3	There are enough photocopiers in my school	1.95	0.01	Low
4	The computers in my school are connected to the internet	2.08	0.00	Low
5	There are television sets and other ICT tools that we use for teaching	1.68	0.14	Very Low
6	My school has a cooperate email which is used for official communication	3.54	0.29	High
7	There are enough printers in my school	3.01	0.06	Moderate
8	There are enough digital cameras in my school	1.52	0.17	Very Low
9	There are enough tablets in my school	1.74	0.02	Very Low
10	There are enough scanners in my school	1.65	0.00	Very Low
11	There are enough pen drives in my school	2.45	0.24	Low
12	There are enough PA Systems in my school	3.01	0.41	Moderate
13	There are interactive white boards in my school	1.00	0.00	Very Low
14	There are special ICT tools for pupils with disabilities like braille keyboard, typing aids, talking calculators, audio books, text magnifiers etc. in my school.	1.52	0.15	Very Low
15	There are tools for video games in my school	1.52	0.37	Very Low
	Average	**2.04**	**0.14**	**Low**

On the other hand, a few ICT facilities were found to be moderately available. These included printers (mean = 3.012), corporate email for official communication (mean = 3.012) and public address (PA) systems (mean = 3.011). While these resources may facilitate administrative and communication functions within schools, they do not directly contribute to classroom-based digital learning experiences. The overall average mean score for technology accessibility across basic schools in the Awutu Senya District was 2.0361, indicating a low level of ICT resource availability. These findings align with the study by Ubogu and Ogbedo (2023), which reported that the lack of adequate ICT infrastructure continues to hinder effective teaching and learning in public schools. Limited access to essential ICT tools not only reduces the effectiveness of digital pedagogy but also exacerbates disparities in educational opportunities, particularly in resource-constrained environments. Addressing these gaps requires strategic investment in educational technology, teacher training, and policies that prioritize the integration of ICT resources into schools.

Research Question 3: What is the confidence level of teachers in using ICT tools in teaching at the basic schools?

The mean scores interpretation, as suggested by Zaki & Ahmad (2017) is as follows: 0-1.89 = very low, 1.90-2.69=low, 2.7-3.49=moderate, 3.5-4.2 = high and 4.30-5.00.

Table 5: Teachers' Confidence Level in Using ICT Tools

S/n	Item on the level of confidence of teachers in using ICT resources	Mean	SD	Interpretation
1	I can boot the computer	4.67	0.13	Very High
2	I use Microsoft Word to type questions and other documents	2.46	0.02	Low
3	I can use the computer to keep records	2.57	0.07	Low
4	I can browse the Internet to get materials for teaching	4.41	0.01	Very High
5	I can use a downloader to download any resource	2.38	0.00	Low
6	I have average typing skills and speed	1.30	0.00	Very Low
7	I can use a search engine such as Google	3.46	0.02	Moderate
8	I can use my phone to make soft copies of images	3.51	0.04	High
9	I can use a scanner to copy images	1.22	0.01	Very Low
10	I can operate the printer that is connected to a computer	2.20	0.02	Low
11	I can use YouTube to view or download a video	2.77	0.00	Moderate
12	I can use email for official and unofficial communication	3.57	0.07	High
13	I can use a projector to teach	2.60	0.00	Low
14	I can use PowerPoint in presenting my lessons	2.51	0.64	Low
15	I use MS Excel to calculate my continuous assessment	1.86	0.20	Very Low
	Average	**2.93**	**0.01**	**Moderate**

The result of Table 5 shows that most teachers had high confidence when it comes to booting the computer and also downloading Teaching and Learning Materials (TLMs) on the internet for the purpose of teaching. Most teachers had moderate confidence with the use of word processors like Microsoft Word, using a downloader to download a video resource and using Microsoft PowerPoint for lesson presentations. Basic school teachers however have low confidence level with typing, using a scanner and using spreadsheet application such as Microsoft Excel to calculate continuous assessment of their pupils.

The average mean score of teacher confidence with the ICT tools was found to be 2.93. This shows moderate level of confidence with ICT tools among teachers of Awutu Senya District. This finding agrees with research by Akaadom & Gorni (2023) which indicated that the ICT skills of basic school teachers in

two regions in Ghana is moderate. Other studies conducted in other jurisdictions indicate a moderate level of ICT skills and self-confidence in using ICT tools among teachers. For instance, Ai et al. (2023) in research in 11 South East Asian countries, found that technical education teachers were moderately proficient in Microsoft Excel but have good internet skills. Karunamoorthy, Mukhtar, Karunamoorthy, and Sukumaran (2019) found that for special education teachers use of ICT tools was moderate.

Teachers' ICT Confidence Beyond Accessibility

The finding that teacher confidence does not differ significantly despite ICT access gaps may be attributed to several factors. First, teachers may have acquired basic ICT skills through prior exposure, personal experience or informal learning, even in the absence of sufficient ICT resources within their schools. Many educators develop digital competencies outside the classroom, using personal devices or internet access at home to familiarize themselves with common applications such as Microsoft Word, PowerPoint and internet-based resources. This aligns with Ai et al. (2023), who found that despite varying access to technology across different regions, teachers often exhibit moderate proficiency in essential digital skills. Second, training workshops and professional development initiatives, even if infrequent, may have contributed to teachers' confidence in using basic ICT tools. Some educators may have participated in government or NGO-led ICT capacity-building programs, which tend to focus on fundamental digital literacy skills like downloading teaching materials, booting computers, and word processing. This explains why teachers report higher confidence in these tasks but lower confidence in more specialized applications like spreadsheet software, scanners, and typing skills. The findings from Karunamoorthy et al. (2019) support this, showing that special education teachers demonstrated moderate ICT use despite infrastructural constraints.

Additionally, teachers' perception of ICT usefulness and their willingness to engage with digital tools may influence their confidence levels regardless of access gaps. Those who recognize the benefits of technology for teaching may make deliberate efforts to learn and improve their skills, even in resource-limited environments. Furthermore, peer support and collaborative learning among teachers can also help compensate for access disparities, as educators often share knowledge and skills informally. This suggests that while ICT access remains a critical factor in digital proficiency, confidence levels are influenced by broader factors such as self-initiative, training opportunities and peer collaboration rather than direct availability of resources alone.

Hypotheses Testing

$H0_1$: There is no significant difference in ICT accessibility between public and private basic schools.

This part of the study was to find out the difference in the technology accessibility between public schools and private school. Mean scores and independent sample t-test was used to analyze the data collected and the result displayed in Tables 6 and 7.

Table 6: Mean Scores of Technology Accessibility in Public and Private Schools

	Type of school	N	Mean	Std. Deviation	Std. Error Mean
Technology Accessibility	Public School	41	1.76	0.55	0.11
	Private School	41	2.55	1.17	0.29

Table 7: Independent Sample T-Test for Technology Accessibility in Public and Private Schools

		t	df	Sig. (2-tailed)	Mean Difference
Technology Accessibility	Equal variances assumed	-3.00	41.00	.005	-0.78
	Equal variances not assumed	-2.53	18.96	.020	-0.78

Tables 6 and 7 reveal that there is significant difference between public school and private schools' technology accessibility. The mean difference yielded a significant value of 0.020 which is found to be significant at 0.05 level (2-tailed). The implication is that public schools and private schools are not at the same level in terms of technology accessibility in the two categories of schools. The observed disparity in technology accessibility between private and public schools may be attributed to the greater preparedness exhibited by private schools. This can be credited to the financial support provided by stakeholders such as parents and school administrators. This result is confirmed by Ayebi-Arthur et al. (2023) and Ampofo and Abrefi (2020), who indicate that most basic schools, especially public schools, do not have enough ICT tools for teaching and learning.

$H0_2$: There is no significant difference in teacher confidence in using ICT tools between public and private basic schools.

This section was to find out the difference in the confidence level of public schools and private school teachers use of ICT resources. Mean scores and independent sample t-test was used to analyze the data collected and the result displayed in Tables 8 and 9.

Table 8: Mean Scores of Public and Private School Teachers' Confidence

Variable	Type of school	N	Mean	Std. Deviation	Std. Error Mean
Level of confidence	Public School	41	4.30	0.634	0.12
	Private School	41	4.28	0.633	0.15

Table 9: Independent Sample T-Test of Teachers' Confidence in Public and Private Schools

		t	df	Sig. (2-tailed)	Mean Difference
Level of	Equal variances assumed confidence	.115	41.00	0.91	0.02
	Equal variances not assumed	.115	31.67	0.91	0.02

Tables 8 and 9 reveal that there is no significant difference in the confidence of use of ICT tools by public school teachers and private school teachers. The mean difference yielded a significant value of 0.909 which is found not to be significant at 0.05 level (2-tailed). The implication is that even though public schools and private schools are not at the same level in terms of technology accessibility, there is no difference in the teachers' confidence in the use of ICT tools.

Interview Responses on Technology Accessibility and Confidence in Teaching

To gain deeper insights into the accessibility of ICT tools and teachers' confidence in utilizing them, semi-structured interviews were conducted with 70 purposively selected teachers from the 350 teachers that participated in the study. The 70 teachers were selected to represent a diverse range of perspectives across different school types (public and private), subject specializations, and levels of ICT experience, ensuring that findings captured varied experiences with ICT integration. The responses provided qualitative support for the study's findings on ICT accessibility, confidence levels, and the differences between public and private schools. Many public-school teachers across various subjects reported severe ICT infrastructure challenges, citing insufficient computers, unreliable internet connectivity and a lack of essential software. A Mathematics teacher explained: "*In my school, we only have one old desktop computer in the headteacher's office. The school does not have dedicated internet connectivity and so we mostly rely on our phones for internet access, besides, we don't have projectors or interactive whiteboards. We rely mostly on theoretical teaching rather than practical ICT integration*." A Science teacher also highlighted the struggle to integrate technology into lessons, stating: "*I sometimes bring my personal laptop to class, but not all students can see the screen clearly. We need more ICT resources to make learning engaging*." In contrast, teachers in private schools generally reported better access to ICT tools, although challenges remained. An English teacher noted: "*We have a computer lab, and students get hands-on experience, but sometimes the internet is slow, and not all teachers are trained in using advanced tools*." A Creative Arts and Design teacher acknowledged the advantage but emphasized the need for

maintenance and upgrades, saying: "*Yes, we have computers, but some are outdated. We need regular upgrades and training to keep up with modern educational technology*." A Computing teacher shared similar concerns, stating: *"As a Computing teacher, I find it challenging to provide students with hands-on experience due to limited resources. We have a few computers, but they are outdated and sometimes malfunction, making it difficult to conduct practical lessons effectively. The lack of internet connectivity also limits our ability to explore online learning resources. While I try to supplement lessons with my personal laptop, it's not enough to give all students equal opportunities to practice. Without proper ICT infrastructure and continuous training, integrating technology into teaching remains a struggle."*

Despite the ICT access gap, most teachers expressed moderate confidence in using basic ICT tools such as Microsoft Word, PowerPoint, and internet browsing. However, confidence levels dropped when dealing with more complex applications like Excel, scanners, and specialized educational software. An English teacher in a public school explained: "*I can type lesson notes and use PowerPoint, but I struggle with Excel. If I need to calculate students' scores, I still do it manually instead of using a spreadsheet*." Similarly, a French teacher in a private school admitted: "*I feel comfortable downloading resources and making PowerPoint slides, but when it comes to using educational software or troubleshooting a* computer *issue, I usually need help*." Interestingly, several teachers credited personal effort and informal learning for their ICT confidence. A Ghanaian Language teacher noted: "*I taught myself how to use a computer because I knew it would help me. I watch YouTube tutorials and practice when I have time*." When asked about the challenges they face, teachers highlighted limited resources, lack of training opportunities and time constraints as key barriers to effective educational technology use. A Religious and Moral Education teacher in a public school stressed the need for continuous professional development, saying: "*Workshops should be organized more often. The one-time ICT training we had was useful, but we need more hands-on practice*." Another teacher from the Science department suggested a collaborative approach, stating: "*If public schools can partner with private schools or organizations for ICT resource sharing, it will help bridge the gap*." To address ICT access issues, some teachers recommended the "one-computer classroom" approach, where a single computer and projector could be used for group instruction. A Mathematics teacher shared: "*Even if we don't have many computers, having one functional computer and a projector in each classroom can make a big difference*." The interview responses reinforced the study's key findings: ICT accessibility is significantly lower in public schools than in private schools, yet teacher confidence remains at a moderate level across both sectors. Teachers' confidence appears to stem from personal effort, informal learning, and occasional professional training rather than direct access to ICT tools. The insights gathered emphasize the need for structured ICT training

programs, public-private partnerships, and creative strategies like the "one-computer classroom" approach to enhance technology integration in teaching.

CONCLUSIONS

This study investigated the availability of ICT tools and teachers' confidence in using them across public and private schools in the Awutu Senya District. The findings reveal significant challenges in ICT accessibility across most schools, regardless of their classification. However, despite these limitations, teachers demonstrated a moderate level of confidence in integrating ICT tools into their teaching. Notably, private schools had significantly better access to ICT resources than public schools, yet no significant difference was observed in teacher confidence levels. This suggests that factors beyond mere ICT availability such as informal learning, personal initiative, and occasional professional development may contribute to teachers' confidence in technology use.

The practical implications of these findings highlight the urgent need for targeted ICT investments in public schools to bridge the digital divide and ensure equitable access to technology for all teachers and students. Policymakers and education stakeholders should expand professional development programs, equipping teachers with advanced ICT skills that go beyond basic digital literacy. Additionally, cost-effective strategies, such as the "one-computer classroom" approach, should be encouraged in resource-constrained schools to maximize ICT integration. Furthermore, fostering public-private partnerships could facilitate resource-sharing initiatives, providing public schools with access to better ICT infrastructure and training opportunities. By addressing these gaps, educational institutions can enhance digital learning environments, ultimately improving teaching effectiveness and student learning outcomes in the district.

RECOMMENDATIONS

To address the challenges identified in this study, a multi-stakeholder approach is necessary to enhance ICT access and teacher confidence in public and private schools. The Ministry of Education (MoE) and Ghana Education Service (GES) should develop national ICT equity policies to ensure a balanced distribution of ICT resources, particularly in underserved public schools. This can be achieved through systematic ICT needs assessments to identify gaps, mobilization of funding from District Assemblies, the private sector, NGOs, and international development partners, as well as the establishment of a sustainable maintenance and upgrade plan for ICT tools to prevent obsolescence. The integration of the "one-computer classroom" strategy should be embedded within curriculum reforms by the National Council for Curriculum and Assessment (NaCCA), ensuring that ICT and pedagogy courses for teacher training institutions incorporate this approach. Teachers should receive targeted training on maximizing the use of a single computer for whole-class instruction through

interactive teaching strategies such as multimedia-based lessons and collaborative learning. The success of this initiative can be strengthened by aligning it with the "One Teacher, One Laptop" project to ensure that teachers are equipped with personal computing devices to facilitate instructional delivery.

Comprehensive professional development programs should be introduced to equip teachers with tiered ICT skills, ranging from basic computer literacy to advanced digital tools for instructional purposes. To ensure effective participation, training workshops should be conducted regularly at district levels, integrating hands-on practical sessions and providing incentives such as certification, promotions or stipends. Additionally, the development of online learning modules will ensure continuous access to training, enabling teachers to develop digital competencies at their own pace. The government must also increase its budgetary allocation for ICT infrastructure in schools to address disparities between public and private institutions. This can be achieved by encouraging public-private partnerships (PPPs) to fund ICT projects, establishing a district ICT fund where local businesses and Parent-Teacher Associations (PTAs) contribute to technology initiatives, and ensuring transparent monitoring and evaluation of allocated funds to maximize impact. Strengthening Professional Learning Communities (PLCs) will further support teachers in effectively integrating ICT tools into their teaching. Schools should designate ICT coordinators to provide guidance, schedule monthly PLC meetings where teachers share best practices in technology-based instruction, and integrate PLC activities into existing school-based teacher support programs. By implementing these strategies, stakeholders can bridge the ICT accessibility gap, enhance teacher confidence, and foster a more inclusive and technology-driven learning environment in public and private schools in Ghana.

Limitations of the Study

While this study provides valuable insights into ICT accessibility and teacher confidence in the Awutu Senya District, several limitations should be noted. First, the study relied on self-reported data, which may introduce response bias, as teachers might have overestimated or underestimated their confidence in using ICT tools. Second, the sample was drawn from a single district, which may limit the generalizability of the findings to other regions with different ICT infrastructure and support systems. Additionally, while the study employed a mixed-methods approach to validate quantitative results with qualitative insights, the interview sample size (70 participants) was relatively small compared to the survey sample (350), potentially limiting the depth of qualitative perspectives. Future research should consider expanding the study scope to multiple districts and incorporating observational methods to complement self-reported data for a more comprehensive analysis.

Future Directions for Research

To build on the findings of this study, future research should explore the long-term impact of ICT training programs on teacher confidence and classroom integration. Additionally, expanding the study

to multiple districts with varying ICT infrastructures could enhance the generalizability of the results. Incorporating observational methods alongside self-reported data would also provide a more comprehensive understanding of teachers' actual ICT usage and challenges.

Author contributions

Dr. Daniel Paa Korsah is a lecturer in the Department of Mathematics & ICT at Komenda College of Education, Ghana. As the lead author, he conceived the research idea, provided guidance in the collection of data, contributed to the analysis and interpretation of the results. He also contributed to the manuscript's development and reviewed it at all stages. Dr. Issah Bala Abdulai, a lecturer in the Department of Mathematics & ICT at Kibi Presbyterian College of Education, Ghana, led the data analysis, contributed to the discussions, and provided critical revisions to the manuscript throughout its development. Eric Duaquaye, a teacher at Awutu Ofaso D/A JHS, Awutu Bawjiase, Central Region, Ghana, conducted the literature review and drafted the methodological framework. He was also involved in data collection and contributed to manuscript revisions at various stages, refining the overall write-up. Henry Chris Korsah, a staff member of the Planning & Statistics Unit at the Awutu Senya District Education Directorate, Ghana, assisted with data collection and analysis. He contributed to the discussion of results and further reviewed the manuscript at all stages to enhance its publication quality.

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