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# Access to Electricity in Ghanaian Basic Schools and ICT in Education Policy Rhetoric: Empirical Quantitative Analysis and Access Theory Approach

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**Abstract:** The attempt to integrate ICTs into the education system in Ghana has existed close to two decades following the adoption of the ICT for Accelerated Development (ICTAD) policy in 2003. However, empirical quantitative studies to analyse the access of basic schools to electricity, which is the major power of technology devices, over the period appear non-existent. This article is a descriptive quantitative analysis of basic school access to electricity for the academic years 2010 / 2011 to 2017/2018 using secondary data obtained from the Educational Management and Information System (EMIS) through the lens of Access Theory. The study was undertaken using secondary educational statistical data and document reviews as data sources. The results of the data analysis indicate a low electricity access rate in basic schools in the Northern Region of the country. The study concludes that the gap between the ICT in education policy rhetoric and the reality in ICT for education (ICT4E) at the Ghanaian basic school level appears unhealthy and requires stakeholders' immediate attention to realize the desired impact of ICT in education policy if the goal of the country to achieve the Sustainable Development Goals 4 and 10 need to be success. The findings of these studies provide valuable insights for policymakers and education stakeholders in designing effective policies and interventions to improve access to electricity and promote the integration of ICT in basic education.

**Index Terms:** Basic schools, EMIS, electricity access, ICT policy, access theory, SDGs, ICT integration, ICT4E.

## 1. Introduction

Governments worldwide have acknowledged the important role of ICT in enhancing education, and have implemented various policies and initiatives to integrate ICT into their education systems. Ghana has taken several consultative steps to involve stakeholders in education and incorporate ICTs into the education sector. Budget allocations have been made to increase access to and usage of ICTs, and to train teachers and administrators in using ICTs in pedagogy and educational management. There are varying challenges identified in extant literature on the implementation of ICTs in schools for teaching and learning. This paper aim to investigate how access to electricity in basic schools impact technology use for teaching and learning. Empirical quantitative analysis and access theory approach have been used to understand the challenges and opportunities for ICT integration in basic schools.

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The availability and use of ICTs in education vary among countries, with some investing heavily in the provision of computers, networking, and training of teachers. ICT integration in education offers new opportunities for learners and teachers to engage in innovative ways of knowledge acquisition and analysis, with the potential to transform Ghana's economy. The Ghanaian government has developed a policy framework and implementation strategies for ICT in education to improve access, equity, and quality of education delivery, with measurable indicators and timelines. Educational reforms worldwide aim to equip students with relevant skills for the twenty-first century, linking education to economic and social progress using ICT. Education reform based on capital deepening, higher-quality labor, and knowledge creation can help promote economic and social progress.

The Ghana ICT for Accelerated Development (ICT4AD) Policy in 2003 had stakeholders from private, public, education managers, and development partners participating in the consultative processes to restructure the implementation of ICT programs in pre-tertiary institutions. This ICT4AD Policy represents Ghana's vision for the transformation and innovation of its economy and society through ICTs as the key engine for accelerated and sustainable economic and social development [1]. Many countries have adopted the integration of ICT into education policy and are implementing it to achieve set targets. For instance, a government initiative was implemented in Hong Kong to integrate ICT into schools in 1998 [2]. Student population access to ICT in Chilean schools in 2005 was more than 90%, and more than 80% of teachers had received training in the administrative and pedagogical use of ICT. These were successes from a government-led ICT program termed Enlaces [3].

There are several reasons why countries adopt ICT in education. Innovation and knowledge creation in a country is heavily dependent on high-quality education for its citizens. The goal of the Ghana government in ICT integration in schools is to achieve the transformation of traditional memory-based learning to education that stimulates critical thinking, collaboration, creativity, and communication that are needed to face the challenges of the 21st century [4]. ICT skills is a requirement for employment in most companies globally today and it is argued that countries that adequately prepare for the information and knowledge age will gain economically. ICT has become a critical requirement in the lives of everyone to enable them fully participate in society. For instance, in 1991, the US Department of Labor's SCANS report expressed those skills for all section-level employees must incorporate the capacity to: (i) access and use information, and (ii) work with various technologies and technology tools [5]. Students, particularly those at tertiary institutions, need to be competent in digital technology to effortlessly engage in effective learning and research activities [6].

Education in the 21st century has essentially become information-based. The primary source of information acquisition and use has rapidly changed due to the explosion of ICTs and networked digital devices. Successful businesses are those that have turned to meaningful use of information and have workers that apply technology to address challenges. The knowledge and information economy underlines the successful usage of tangible resources such as a digital economy, skill set, and creative potential such as the main resources for competitive advantage. As such, a robust ICT network is the enabler for technological advancement and growth. For these outcomes to be achieved, there must be a better implementation of a thoroughly designed, comprehensive, and functionally applicable ICT in education policy [7].

## 2. Electrification in Northern Ghana and Ghana's Basic Education System

The electricity distribution in the northern region of Ghana is undertaken by the Northern Electricity Department Company (NEDCo). The Volta River Authority established the Northern Electricity Department (NED) in 1987 to distribute electricity in the northern sector of the country. In June 1994, the Government of Ghana (GoG) initiated the Power Sector Reform (PSR) program aimed at bringing efficiency and managerial effectiveness in the Energy Sector to improve service delivery to all consumers. The country is predicted to achieve universal access to electricity for domestic use by 2020 if the 4.38% annual electrification access improvement rate is maintained. NEDCo is essentially the only company providing access to electricity in the northern sector of Ghana, and clients are placed as either post-paid or pre-paid customers depending on the type of electricity metering issued to customers.

Like many public institutions, NEDCo and the Volta River Authority are fraught with challenges in the distribution and service of electricity. The challenges affecting electricity expansion in African countries include poor quality supply leading to inability to meet growing demands, the inability of countries to fund expansion, and inadequate finance leading to reliability challenges [8].

Basic education in Ghana is structured in the 2-6-3 format. Children enrolled in basic education spend two years of kindergarten, six years of primary school, and three years of junior high education. Children start kindergarten at the age of four and primary school at the age of six. English, Ghanaian languages and culture, ICT, mathematics, environmental studies, social studies, and French, integrated science, pre-vocational skills and pre-technical skills, religious and moral education, and physical activities such as Ghanaian music and dance are among the subjects taught at the primary and junior high school level. Academic years in Ghana start in September and end in August the following year. At the end of the primary school, no certificate of completion is awarded to learners. Junior high school (ages 12–15) lasts three years. The Basic Education Certificate Examination is the last exam in JHS, and the subjects examined included ICT. Until April 2020, when the school calendar was disrupted by covid-19, the academic calendar starts from September to August the following year.

A recent study on the pedagogical integration of ICTs in 24 Ghanaian schools indicated that there is a gap between policy directives and actual practices in schools [9]. The study also found attempts by the Ministry of Education to deploy ICT resources to schools to develop the needed ICT literacy required for computer skills to be integrated into teaching and learning. However, the deployment of ICT resources to schools might make little impact on ICT integration in schools without ensuring increased access to electricity needed to power these technology tools for basic schools.

## 3. The ICT in Education Policies (2008 and 2015 Policies)

The policy supported the vision and mission of the Ministry of Education by outlining how the sector would use ICTs to create the necessary human resources for the country to satisfy labor market demands, both domestically and globally. According to the policy document, existing policy and strategy documents in the ministry were assessed to ensure attention to equity, access, and quality, which are significant educational concerns. According to international experience, technology has significant potential for information distribution, knowledge acquisition, effective learning, and the development of more efficient education services. ICT in Education Policy was seen by the Ministry and its sector actors as the goal of reforming the educational system. It was established to serve as a road map for effectively and efficiently employing ICTs to support the educational sector's aims and operations, as well as national development efforts, such as the ICT4AD Policy of 2003. It illustrates in the policy the need to plan the effective use of ICTs for a positive impact and heavy expenditure associated with ICTs, especially for developing countries such as Ghana.

The implementation efforts of ICT in the education policy of the government of Ghana have been largely toward the deployment of ICTs through the provision of computers and the establishment of computer laboratories. There have been other private sector efforts through the setting of community-based ICT centres and training for teachers [10]. Recognizing that information and communication technologies (ICTs) must support rather than drive the implementation of educational strategies, the policy document provided a clear purpose and rationale for the effective integration of ICT into, education, including identifying opportunities, issues, challenges, and strategies that could be used. The overall mission of the ICT in the education policy of Ghana states “articulate the relevance, responsibility and effectiveness of using Information and Communication Technologies (ICTs) in the education sector, to address current sector challenges and equipping Ghanaian learners, students, teachers and communities in meeting the national, and global demands of the 21st-Century” [11].

The National ICT in Education Policy for 2015 is a development and review of the ICT4AD policy (2003) and the National ICT in education policy in 2008. The government of Ghana describes this policy document as representing critical steps to be taken to streamline its efforts in creating building blocks for ICT integration in the education sector. The policy document is believed to be the platform to propel ICT in education delivery with three pillars: ICT as a learning and operating tool, ICT is integrated into the teaching and learning process, and ICT as a career option for students.

Besides these pillars, the ICT in Education Policy for 2015 has as its guiding principles and strategies assuring infrastructure, e-readiness, and universal access, as well as incorporating ICT into the curriculum. There were, however, certain challenges with the previous policies acknowledged in the National ICT policy for 2015. These included a lack of educated or motivated ICT support people to support programs, as well as a shortage of teachers capable of integrating ICT into their curriculum or projects in a contextually relevant manner that would create and sustain learners' interests.

## 4. Electricity as an Enabler for Technology Adoption and Use

The achievement of universal access to electricity has globally become a policy issue. About 1.1 billion people, the majority of whom live in rural communities, did not have access to electricity [12]. Electricity access rates are even lower in lower - income countries such as sub-Saharan Africa and ASEAN countries [13]. Access to electricity is a fundamental human right and a key to economic and social developmental activities. Limited or no access to electricity would limit modern critical social services such as education and use of technology. Given the critical role of electricity in fuelling technology tools such as computers, tablets, and projectors, this paper investigates the access of basic schools to electricity to use technology for teaching and learning. Many proponents of access to electricity have mentioned increased educational attainment as its attendant benefit. Empirical literature on the impact of access to electricity on educational attainment has found a positive effect [14].

Learner’s access to ICTs and access of educational institutions to electricity have a significant influence on learning delivery modes [15]. ICT is yet to make a significant impact in education due to the lack of reliable and adequate electricity in Africa [16]. In developed countries where heavy investments have been done in ICTs and electricity (e.g., USA and Finland), research indicates that ICTs offer increased opportunities for rapid and sustainable economic growth, increased productivity, improved educational outcomes, and the international competitive advantage. Like in developed countries, ICT can make significant impacts in various sectors including education in Africa. However, these impacts have not been realized due to various constraints. Electricity availability and reliability is the major prerequisite [13] since all ICT devices use and need regular supply of electricity, and this seems impossible to

achieve in Africa. The development of lofty ICT policies would have little to no significant impact on ICT integration in schools if access to electricity is not improved in schools.

Several studies have highlighted the importance of access to electricity for the effective integration of ICT in education. One such study is by [14], which examined the relationship between access to electricity and ICT use in Zambian primary schools. The study found that access to electricity was a crucial factor in determining the level of ICT use in schools. Another study by [15] in Liberia similarly found that the lack of access to electricity was a significant barrier to the integration of ICT in schools. The access theory approach has been used to understand the barriers and opportunities for accessing ICT in education in developing countries. For example, [16] applied the access theory framework to examine the challenges facing ICT integration in African schools. The study found that access to electricity was a significant barrier to ICT integration and recommended the use of alternative energy sources, such as solar power, to address the issue. In Ghana, several studies have focused on the challenges and opportunities for integrating ICT in basic education. For example, [17] examined the challenges facing ICT integration in Ghanaian basic schools and found that inadequate infrastructure, including a lack of access to electricity, was a significant hindrance. Another study by [18] examined the relationship between ICT integration and academic performance in basic schools in Ghana and found that ICT integration had a positive impact on academic performance.

## 5. ICT Support for Achieving Educational Outcomes

Some extant international research [17-23] have revealed that basic school teachers lack the necessary skills to use ICT as a pedagogical instrument in the teaching and learning process. In many schools, pupils are still being taught what learners were taught in the 1950's with the same approaches because of the ineffective use of ICT as a pedagogical tool being a consequence of poor ICT in education implementation strategies. Even though there is a dramatic impact and growth of ICT in the general society, many classrooms and schools still look like and function in a remarkably similar fashion as those of two decades ago.

According to a study by [19], while some teachers continue to be hesitant to use new technologies, others are afraid of trying new approaches that they believe may have a harmful impact on the performance of their learners. For some teachers, employing technology to help learning and teaching, as well as using more constructivist techniques, appears to be risky choices, and they prefer to remain with tried and tested teaching approaches that allow them to anticipate and manage learning outcomes more easily. [24] study of ICT use for teaching and learning in Manicaland Zimbabwe schools discovered a lack of good examples of best practice in the use of ICT in teaching, with only a few teachers recalling when they typed notes for students or searched for information to update their teaching notes. He discovered that teachers were primarily employing lecture and note dictation as instructional approaches. This suggests that ICT is not being used effectively as a pedagogical tool in the classroom, pointing to evidence of implementation lapses in our schools.

[25] discovered that ICT was not considered as a critical tool to transform teaching and learning in schools in their study with insights into creative classroom practices with ICT in China. It is worth noting that using ICT as an educational tool entail more than just having computer hardware. It entails the use of software to solve problems, expand student capacity, produce goods, or communicate and share their opinions [26]. In one of the most insightful research works on ICT in education, [27] analyzed the factors that affect the perception of the implementation of ICT policy in education in the empirical context of higher education in Namibia from students' perspective. The study recognizes the lack of ICT skills and limited access to training and learning content as some of the critical challenges affecting ICT in education implementation in Namibia.

Some critics [28-31] have questioned the seemingly increasing expenditure in ICT policies in general and in education, by nations. They doubted if more or better ICTs in education automatically translate into more and better education for learners. Teachers' usage of technology in the classroom is linked to their opinions, perceptions, and beliefs about its usefulness to teaching and contribution to teaching outcomes [32,33]. Furthermore, research has revealed a gap between teachers' opinions of the usefulness of technology and how ICT may be implemented in classrooms. External or first-order constraints, such as the quality of ICT training and chances for training, technical assistance available, infrastructure inadequacies, school policies, and leadership, can all affect the effectiveness of ICT programs in schools [34]. However, variables such as teacher competency in ICT, belief systems, and teaching philosophy, which are internal to the teacher or second-order barriers, have a role in determining the effectiveness of any policy, and policymakers should be aware of the interrelationships between these factors. External variables or impediments might be addressed by assigning extra resources to schools, for example, by equipping them with enough computers and software packages or by providing additional computer training for teachers, [34] suggested. Internal variables they added are far more difficult to modify regarding boosting ICT use in schools. Technological pedagogy, teacher competencies in ICT, teacher beliefs, and technical assistance might be determined as constraints on technology use in schools only when the schools have access to a regular supply of electricity and adequate technology tools.

The influence of ICT use on academic achievement is difficult to determine since few teachers use computers for instructional purposes at the basic education level due to a lack of electricity and other constraints. The poor usage of ICT by educators and students is attributed to a lack of electricity and an inconsistent power supply, which results in

frequent computer breakdowns [9,35]. It is for this purpose that this article seeks to examine the level of electricity access in basic schools in the northern region of Ghana for an eight-year period.

## 6. Access Theory

Access to resources has been widely studied, theorized, and presented in the literature. The capacity to profit from things – such as tangible stuff, people, institutions, and symbols – has been characterized as access [36]. The focus of this study is on basic schools' access to electricity and shall take the perspective of material objects and institutions. Without emphasizing on property ties, the definition's focus on capacity draws attention to a broader variety of social interactions that might restrain or empower individuals to gain resources. The concept of access aims at promoting a more thorough examination of who benefits from things and how they do so. The empirical focus of the theory of access remains on the concerns of who gets to use what, in what way, and when. [37] describes 'use' to mean the enjoyment of a type of benefit or benefit stream by virtue of access to a resource or 'thing'.

Access to resources is controlled by people and institutions, and others must retain access to these resources through those in charge of the acquisition process. By paying close attention to the differences in access relationships, access may also be defined as dynamic analytic. Understanding why certain persons or institutions profit from resources, whether they have rights to them, is possible through access analysis. Access refers to all ways in which a person or organization can benefit from something. This access analysis establishes how and why basic schools acquire access to electricity and the benefits derived from this resource making 'gaining access', the more general process by which access is established, a terminology of essence.

The identification of the object of inquiry - a specific benefit derived from a specific resource – is required for resource access analysis. A resource's benefits can be realized through production, extraction, product transformation, or consumption. The benefits of access to electricity in an educational institution would enable the use of ICT and general technology tools to transform the teaching and learning process and environment to enable the acquisition of the needed 21st-century development skills in learners.

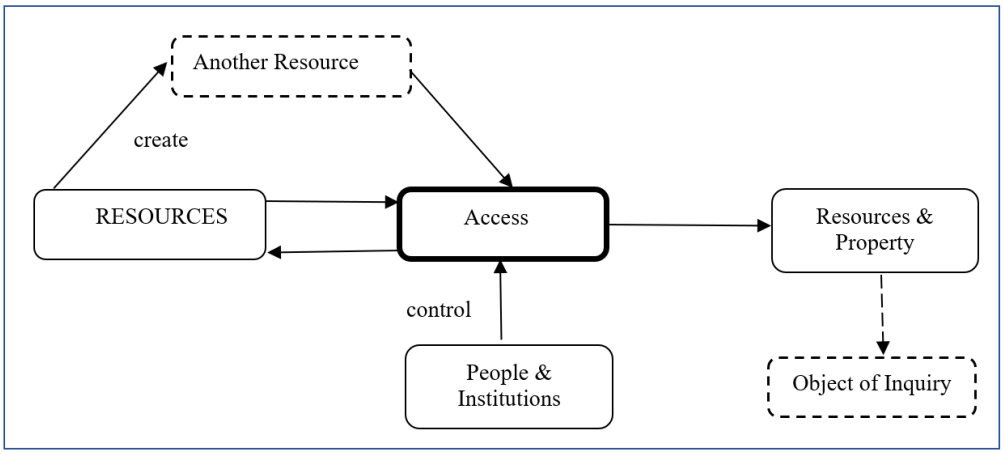


Fig. 1. Access theory conceptualized by Authors

Access to technology, like any other resource, mediates resource access in several ways as some resources cannot be extracted, created, or developed (for instance human skills, knowledge, innovation, etc. in the case of education) without access to some form of resource. Access to a certain resource could be used by people or institutions to create the object of inquiry to result in another resource. For instance, the development and training of the right human resources through education for a country depend on access to critical resources, including access to electricity in schools required to adequately achieve this feat. Those that have access to more modern technology resources profit more and better. These many technologies, as well as their related networks of institutions and linkages, are referred to as "modes of extraction" [38].

This theory has been crucial in advancing the academic discourse on property and examining the ideas of power, control, and resource access. In this study, this theory is discussed in connection with materiality, control, power, and sustainable livelihoods. The researchers make the same argument that talks about resources are linked to enforceable claims of usage or benefit to a wider group of actors. Using this theoretical framework, a method of access analysis will be useful for understanding the level of access that basic schools must electricity to enable various users of the resource prosecute teaching and learning activities in schools, particularly the teaching of ICT and related subjects. This concept enables scholars, policy makers, and planners to empirically validate the dynamic nature and reality of access to electricity by education facilities and education actors and the consequences of a lack of access to this critical resource in education.

## 7. Methodology

A quantitative case study was chosen for this study because our aim was to illustrate how ICT in education policy is implemented to achieve its intended outcomes through the lens of access to electricity, a critical enabler to the success of the policy. Although it could be uncommon for outcomes from case studies to be generalized as is done with data in the natural and physical sciences, it is possible through quantitative data [39]. It is possible for knowledge transfer to occur through the outcomes of quantitative case studies [40].

To enable us better illustrate the implementation of ICT in education policy implementation in the Northern Region of Ghana, we purposively selected educational data from the Educational Management and Information System (EMIS) managed by the Ministry of Education, Ghana. The researchers selected EMIS because it is the official educational database for the Ministry of Education in Ghana and is the major source of the Government of Ghana's educational data for basic and senior high schools. The EMIS data provided convenience and readily available high-quality large educational data for the researchers [41].

We obtained a copy of the educational data for the period of 2010/2011 to 2017/2018 academic years on a compact disk (CD) from the Ghana Education Service Directorate. The copy contained educational data on various indicators (i.e., water, furniture, books, toilets, etc.) in a spreadsheet and portable document format (pdf). Since the focus of the study was on access to electricity in basic schools, the electricity indicators in a spreadsheet file format were selected to enable easy analysis and interpretation. The district, total number of schools, total number of schools with access to electricity, and the academic years in which the data were collected from the schools were isolated in a spreadsheet format for analysis.

The extracted educational data from EMIS formed the core data for the study, but additional data were sorted in the form of document analysis from the Ghana ICT in Education Policy (2008) and the Ghana ICT in Education Policy (2015-Review). These documents were used to provide context information and to triangulate data to provide a perspective to the study [39]. Electronic copies of these documents were obtained from the website of the Ministry of Education, Ghana.

With the support of the jamovi quantitative analysis software and Microsoft Office Excel 2016, the quantitative data were analyzed with descriptive and inferential statistics to understand the phenomenon of electricity in basic schools. The research used a descriptive and correlational design. The descriptive design was used to study the characteristics of the population, while the correlation design was used to explore the relationship between the variables (i.e., basic schools and access to electricity) and to also test for significance. The main categories of issues in the analysis are trends in electricity access, average percentage growth, and gap in access to electricity, etc. These issues form the main discussion in this paper.

## 8. Results Analysis and Discussion

In this section, the findings and discussions that emerged from the data variables are presented along the lines of the research objectives. This article focuses, in general, on the investigation of basic schools' access to electricity in the Northern Region through the lens of EMIS data acquired from the Ministry of Education for the period of 2010/2011 to 2017/2018 academic years. The findings were analysed and presented in frequency tables and graphs for easy interpretation and understanding.

Table 1. Number of Basic schools and electricity access for 2010/2011 to 2017/2018 Academic Years (source: EMIS, 2018)

| Acad_Year | Tot_Basic_Pub | Basic_Elect | Basic_Elect_% | Annual_Inc_Rate | Basic_No_Elect | Basic_No_Elect_% |
|---|---|---|---|---|---|---|
| 2010-2011 | 2755 | 274 | 9.95 | 3.73 | 2481 | 90.05 |
| 2011-2012 | 2815 | 385 | 13.68 | 4.43 | 2430 | 86.32 |
| 2012-2013 | 2932 | 531 | 18.11 | 1.85 | 2401 | 81.89 |
| 2013-2014 | 3021 | 603 | 19.96 | 6.88 | 2418 | 80.04 |
| 2014-2015 | 3185 | 855 | 26.84 | 0.81 | 2330 | 73.16 |
| 2015-2016 | 3345 | 925 | 27.65 | 6.36 | 2420 | 72.35 |
| 2016-2017 | 3546 | 1206 | 34.01 | 2.06 | 2340 | 65.99 |
| 2017-2018 | 3671 | 1324 | 36.07 | 3.73 | 2347 | 63.93 |
| Average | 3159 | 763 | 23.28 | 3.73 | 2396 | 76.72 |

Table 1 illustrates the basic statistics of the number of both public and private basic schools for the 2010/2011 to 2017/2018 (eight academic years) academic years with the number of schools with access to electricity, as reported by the Educational Management and Information System (EMIS). Over this period, the number of basic schools in the region increased by 33.24%, and electricity access to basic schools increased by 383.21%. On Average, there are 3,159 basic schools with 763 (23.28%) basic schools reporting to have access to some form of electricity.

It can be observed from Figure 2 that out of a total of 2544 public basic schools, the number of schools without access to electricity in the 2010/2011 academic year is 2319 (91.2%) with only 255 schools reporting to have access to some forms of electrical power. There is a year-on-year increase in the percentage of schools with access to electricity,

although the highest is the 2014/2015 academic year (9.2%). For the eight-year period, the public basic schools without access to electricity stand at an average of 77.8% with a mean reduction rate of 3.9%. At the end of the 2017/2018 academic year, 1965 (63.9%) of public basic schools have no access to any form of electricity. Addition, it can be drawn from the data that education managers of public basic schools in the northern region have not been able to achieve 50% access to electricity for the schools.

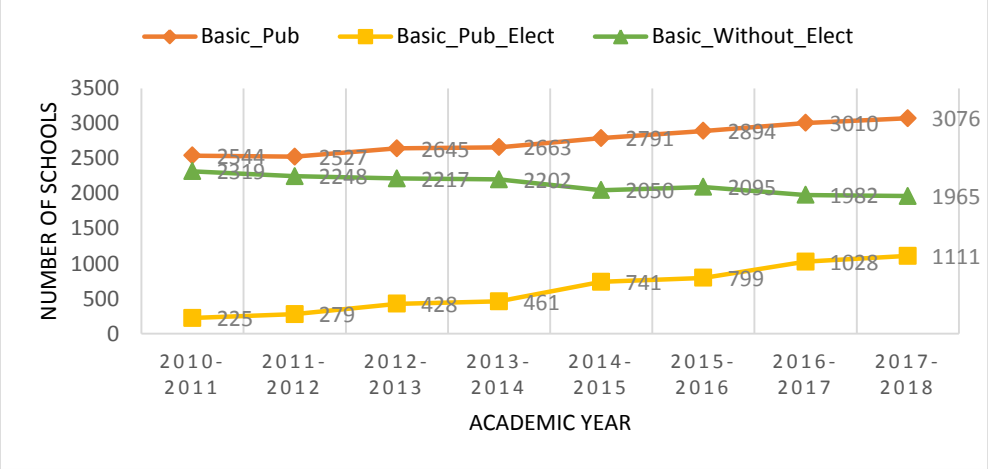


Fig. 2. Number of public basic schools, schools with electricity, and schools without electricity (source: EMIS, 2018)

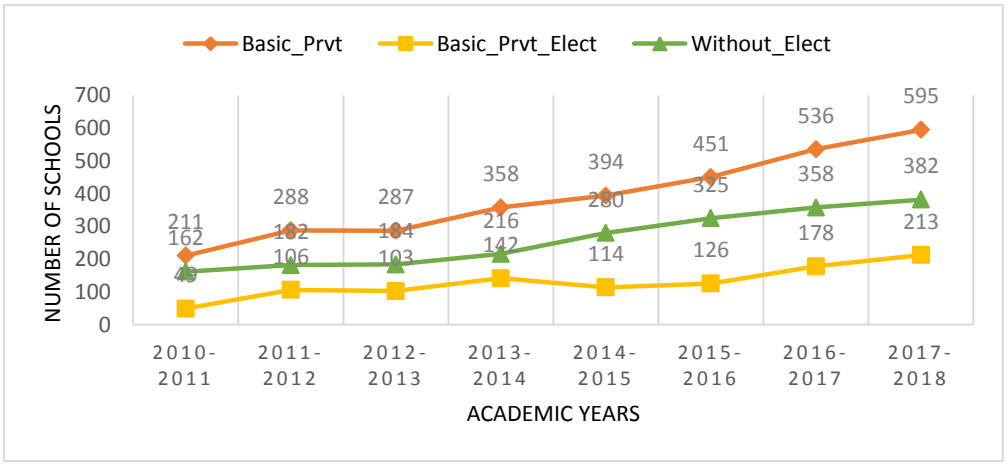


Fig 3. Number of private basic schools, schools with electricity, and schools without electricity (source: EMIS, 2018)

In Figure 3, from a total of 211 private basic schools, the number of schools without access to electricity in the 2010/2011 academic year was 162 (76.8%), with only 49 schools reporting to have some form of access to electrical power. It is in the 2013/2014 academic year that private basic schools in the region had their highest percentage of access to electricity (i.e., 39.7% (216 schools)). It can be concluded that, on average, 67.3% of private basic schools in the region in the 2017/2018 academic year had no access to electricity from the national grid or other sources of energy, although there was a 1.8% average increase rate of electricity access from 2010/2011 to 2017/2018 academic year.

Figure 4 indicates 90.05% and 76.8% gaps in the access of public basic schools and private basic schools, respectively, to electricity in the 2010/2011 academic year. It demonstrates a higher access to electricity in private basic schools than public basic schools. With an increase in the average access rate of 3.9% and 1.8% for public basic schools and private basic schools, respectively, the public basic schools reduced the gap to 63.93% and compared to 64.20% in private basic schools.

It can be deduced from the data that for a total of 3671 basic schools in the Northern Region, 1324 (36%) schools had access to electricity as in the 2017/2018 academic year. With the annual electricity access growth rate of 3.73%, it could take the region several years to achieve universal access to electricity in all basic schools and it might impact negatively the objectives of the ICT in education policy for the country. For instance, the policy commitment of the Ghana ICT for Accelerated Development policy has as one of its objectives in education: "To modernize the educational system to improve the quality of education and training at all levels of the educational system and expanding access to educational, training, and research resources and facilities" [1]. The ICT in education policy for 2008 illustrates under the guiding principles of policy implementation that "The availability of appropriate infrastructure is key to facilitating the deployment of ICT at each level" and "Equity of access must be an overriding

consideration in any ICT program being implemented" [42]. Similarly, the policy acknowledges the critical role of electricity in ICT use in schools and suggests the need to explore cost-effective alternatives for schools without a regular supply of electricity. With this data on poor access to electricity in basic schools, it would be difficult to understand how the education system can be modernised to enable learners achieve basic computer literacy as expected in the National ICT4AD. It might also be challenging to achieve equitable quality education and promote lifelong learning for all, as envisioned in Sustainable Development Goal 4 [43].

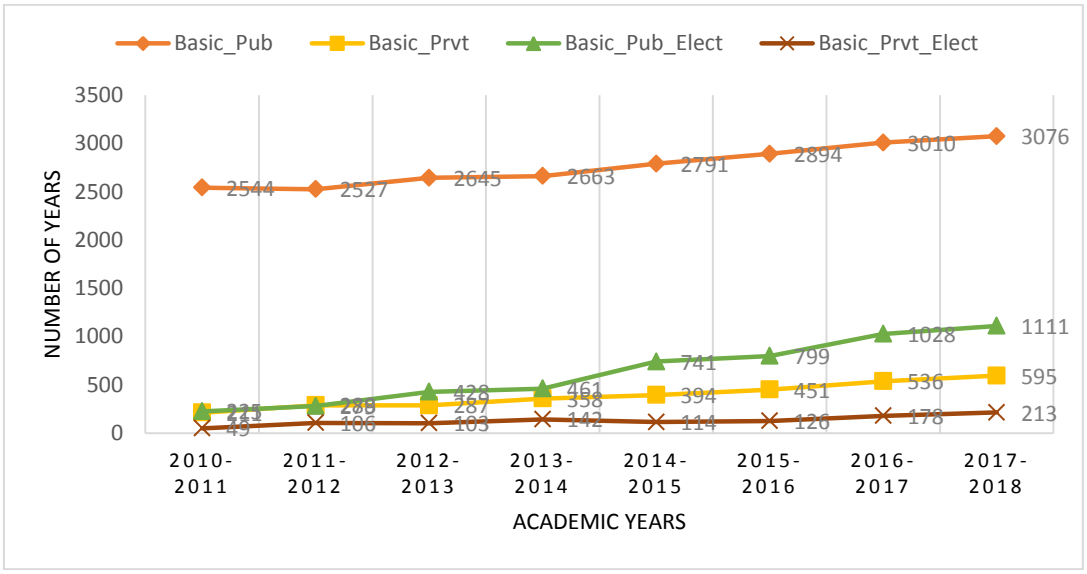


Fig. 4. Total public and private basic schools versus schools with access to electricity (source: EMIS, 2018)

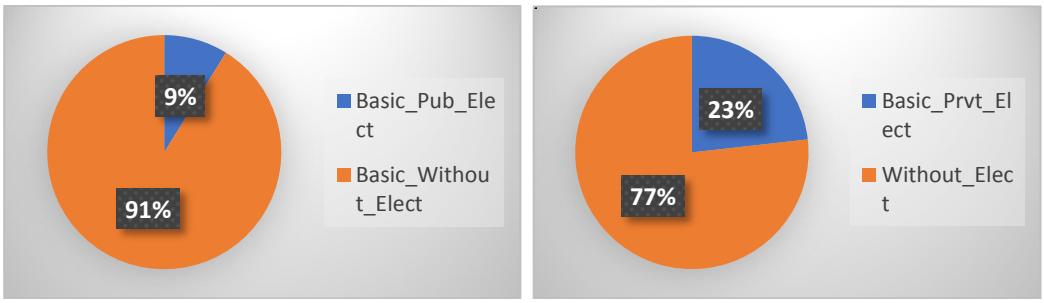


Fig. 5. Public and Private schools' access to electricity for the 2010/2011 Academic Year

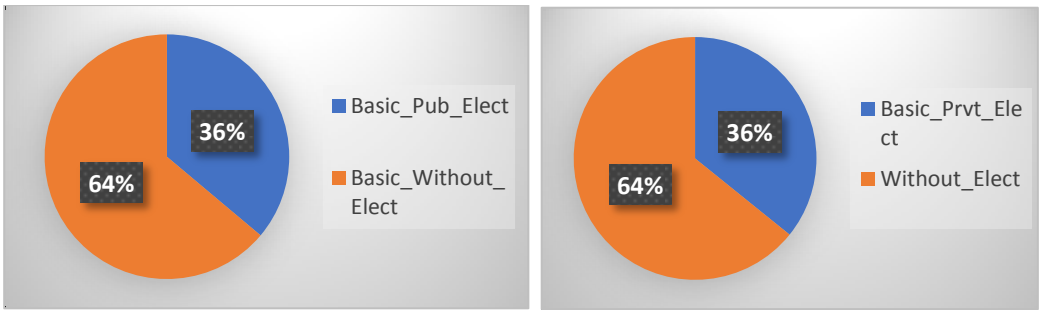


Fig. 6. Public and Private schools' access to electricity for the 2017/2018 Academic Year

From 9% access to electricity in the 2010/2011, public basic schools increased access by 25% to 36% in the 2017/2018 academic year. In this period, private basic schools increased access to electricity by only 13% to 36%. It can be deduced from the data analysis that public basic schools performed better in improving access to electricity. It would be intriguing to understand the factors that might account for the slow access rate.

Africa is reported to have household Internet access of 18% and household computer ownership of 11% [44], making the home not an alternative environment to school for the acquisition of basic computer skills and learning through computers. The findings of this study seem to corroborate the position of [45] that inadequate infrastructure in schools would affect the achievement of the objectives of the ICT in education policy. [46] also argue that the government of Ghana has failed to support schools with the needed ICT infrastructure for teaching and learning in schools. The findings of this study appear to vindicate this claim. ICT is identified among the critical factors responsible

for widening economic inequality in recent decades and the future [47,48]. It stands to reason that the widening economic inequality might not only worsen, but the region stands the risk of not gaining much from the policy.

Governments' ICT support and investment have a great impact on sustainable development in education. It would also improve the country's economic and social performance. Progress toward sustainable development in education requires a rigorous ICT policy, combined with strong political will, to encourage Integrated Information and Communication Technologies Infrastructure (IICTI) investment, acquisition, and usage. ICT policy is critical for leveraging knowledge for sustainable development [49]. However, ICT policy would be less successful if not tailored to organizational -specific needs and strategies and propelled by the necessary input to support implementation.

## 9. Conclusion

The study concludes that the gap between the ICT in education policy objectives and the number of basic schools with access to electricity appears undesirable for achieving policy goals in the region. This unhealthy situation calls for a rethinking of policy implementation strategies and procedures to close the gap between policy rhetoric and reality in basic schools to maximise the benefits of ICT in education policy. It is of grave concern that some challenges have caused the deprivation of access to a critical resource such as electricity in education. These challenges must get the immediate attention of institutions that control and maintain access to electricity as well as agents of educational facilities. The Access theory was used as a framework for the study, which postulates that access to resources is a key determinant of social and economic development. This theory has been widely used in various fields such as health, education, and technology, and its application to the context of electricity access in basic schools in Ghana provides a unique contribution to the literature.

The research findings provide new insights into the current state of electricity access in basic schools in Ghana and highlight the need for urgent action to address the issue. Furthermore, the study provides evidence to support the argument that the rhetoric of the ICT in education policy is not matched by the reality of the situation on the ground. If basic schools lack access to electricity, it becomes challenging to implement the ICT in education policy effectively.

Access to electricity is a fundamental requirement for the provision of quality education. The study contributes to the literature on the impact of lack of access to electricity in education, especially in developing countries. The findings can inform policy and decision-making processes aimed at improving access to electricity in basic schools in Ghana and other developing countries.

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