The Digital Edge in Education: Harnessing ICT for Optimal School Management

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Abstract

In the rapidly evolving digital landscape of today, a notable transformation towards digitalization is observed across diverse domains. While numerous research endeavours have scrutinized the utilization of Information and Communication Technology (ICT) within educational contexts, scant attention has been directed towards comprehending the extent of ICT integration within school management processes, particularly by head teachers within the distinctive locality of Wa Municipal. This study, therefore, rigorously investigates the integration of ICT in school management, focusing explicitly on the perspectives and practices of head teachers within the geographic confines of Wa Municipal, Ghana. Employing an explanatory sequential design within a mixed methods framework, data was meticulously collected from 252 participants through the administration of structured questionnaires and targeted interview guides. The exhaustive analysis of the amassed data uncovers a discernible optimistic trajectory, illustrating active adoption and gradual integration of ICT within the tapestry of school management practices by head teachers. However, this ascent is punctuated by formidable impediments, notably encompassing deficiencies in formal ICT training and expertise, financial limitations, suboptimal internet infrastructure, erratic power supply, and non-intuitive ICT tool interfaces. In spite of these challenges, this study staunchly highlights the transformative potential of ICT, positing it as a powerful enabler for streamlining administrative procedures, enhancing communication efficacy, and elevating the overall operational efficiency in the domain of school management. The research findings resoundingly advocate for targeted training initiatives, infrastructural enhancements, and the design and adoption of user-centric ICT tools as pivotal strategies to capacitate head teachers, thus propelling the seamless integration of ICT within school management. Such integration, in turn, holds promise for cultivating an enriching and conducive scholastic milieu, aligning with contemporary paradigms of effective educational administration.

Keywords: ICT, School, Management, Technology, Challenges

1. Introduction

The integration of Information and Communication Technologies (ICT) in school management is essential for enhancing educational processes and outcomes [1, 2]. ICT implementation streamlines administrative tasks, like record-keeping and attendance monitoring, allowing staff to focus on other critical responsibilities [3, 4]. It facilitates efficient communication among stakeholders, including staff, parents, and students, ultimately fostering a positive learning environment. Moreover, ICT provides access to a wealth of educational resources, enriching the learning experience and diversifying teaching materials [4, 5]. Although the potential benefits are significant, the adoption of ICT in school management, particularly in developing countries like Ghana, faces challenges such as inadequate infrastructure, technical expertise, and resistance to change [6, 7]. The digital divide further exacerbates disparities in access to technology, emphasizing the need for equal ICT resource availability. Globally, the adoption of ICT in education has been growing steadily, propelled by initiatives like

UNESCO's "ICT in Education," although progress varies across regions [7]. In sub-Saharan Africa, including Ghana, challenges like limited internet access and poor connectivity persist, hindering widespread adoption. Despite efforts by the Ghanaian government to promote ICT use in education, barriers such as inadequate ICT infrastructure in schools remain prevalent [6, 7].

Previous studies on ICT adoption in Ghana have mainly focused on the use of ICT in teaching and learning, with limited attention given to its use in school management [6, 1]. However, some studies have highlighted the potential of ICT to improve school management practices in Ghana [3, 1, 4, 5]. A study by Alhassan and Issahaku (2019) found that ICT tools such as school management software and electronic student records can improve school management efficiency and reduce errors. Despite the potential benefits of ICT in school management, there is little research on its adoption and use by head teachers in Wa Municipal. This study therefore aims to fill this gap by examining the adoption of ICT by head teachers in school

management in the Wa Municipal. To achieve this objective, the study raises these questions: (1) What is the level of ICT integration in the management tasks performed by head teachers? What is the impact of ICT adoption on the effectiveness of school management by head teachers in Wa Municipal? What are the challenges faced by head teachers in adopting and using ICT in school management? Answers to these questions will nuance the literature on ICT adopting and usage in educational settings. They will also provide a framework for policy formulation geared towards improving ICT adoption in school management practices in Wa Municipal and beyond.

The paper is divided into six sections: the first offers a background to the study, detailing issues of ICT adoption in educational settings across the globe and the challenges therein while indicating the gap that exists in literature necessitating this current study. The second section provides a theoretical perspective to the adoption and use of ICT in educational settings thereby offering an analytical framework for the study. The third sections detail the methodology that was developed to conduct the study, the fourth presents the findings of the study, the fifth discusses this finding and the sixth section, which is the last of the paper, offers a conclusion and recommendation.

1.1. Theoretical Perspective

Information and Communication Technology (ICT) is a term used to refer to a collection of technologies that enable the creation, processing, storage and dissemination of information by electronic means [8]. It refers to the use of computers, software, networks and other digital devices to perform various tasks and functions, including communication, data management, analysis and processing [9]. ICTs have become a critical component of modern society, changing the way people live, work and interact with each other [10]. Their impact can be seen in various fields, including education, healthcare, business, entertainment, etc. One of the key benefits of ICTs is their ability to improve communication and information sharing [9]. Through various electronic means, such as email, instant messaging, social media and video conferencing, people and organisations can communicate and collaborate with others, regardless of geographical distance. This has resulted in increased productivity and efficiency, as well as better access to information and services.

ICTs have also enabled new forms of learning and education, such as online courses and e-learning platforms [8]. This has increased access to education, allowing people to learn at their own pace and from anywhere with an internet connection. In addition, ICTs have made it possible to personalise learning experiences, adapting them to the needs and preferences of individual learners. ICTs have also changed the way businesses operate, allowing them to streamline processes, increase efficiency and reach a wider audience through e-commerce platforms [10]. They have also opened up new opportunities for entrepreneurship as people can start and run businesses from anywhere in the world.

The level of ICT adoption in Africa varies across the continent,

with some countries showing significant progress while others are lagging behind. According to the International Telecommunication Union the overall ICT development index (IDI) for Africa is lower than the global average, indicating that there is room for improvement. One of the main challenges of ICT adoption in Africa is the lack of infrastructure, including limited access to electricity and poor network connectivity [11, 11]. This has resulted in limited access to ICT services, especially in rural areas. In addition, the high cost of devices and internet services is also a significant barrier to adoption.

Despite these challenges, there has been significant progress in some African countries, particularly in the adoption of mobile phones. According to the Global System for Mobile communications Association Africa has the highest mobile phone penetration in the world, with over 477 million unique mobile phone subscribers [12]. This has led to the emergence of various mobile-based services, including mobile money and e-commerce platforms, which have changed the way businesses do business and access financial services [11]. In addition, investment in infrastructure and ICT development has increased in some African countries, and a number of governments have implemented policies and initiatives to promote ICT adoption [13]. For example, the government of Kenya has implemented a 'Digital Literacy Programme', which aims to provide every primary school pupil with a tablet computer and Internet connection to enhance learning. [14].

In addition, some African countries have made significant progress in developing their digital economies. Rwanda, for example, has implemented various strategies and initiatives to promote digital innovation and entrepreneurship, including the creation of innovation hubs and the implementation of a national broadband policy [15]. This has led to the growth of the country's ICT sector and the emergence of a vibrant start-up ecosystem. However, the COVID-19 pandemic has highlighted the digital divide in Africa, where many people and communities lack access to digital technologies and services [15]. This has led to disruption in education, health and other sectors, highlighting the urgent need to close the digital divide. The adoption and use of ICTs also raises some concerns, including issues related to privacy, security and the digital divide. The digital divide means unequal distribution of ICT resources and access to technology, which can lead to social and economic inequalities.

According to the Organisation for Economic Co-operation and Development (OECD) report, the use of technology in school management is increasing worldwide. The report indicates that schools and education systems are increasingly using technology to support administrative tasks, improve communication and enhance teaching and learning [8]. The use of educational software and tools, such as learning management systems (LMS), is becoming more common in schools around the world. According to a report by Research and Markets, the global educational LMS market is expected to grow at a compound annual growth rate (CAGR) of 22.6% from 2020 to 2027.

The use of social media and other communication platforms

by schools and education systems is also growing. According to a report by Hootsuite, as of 2021, 3.78 billion people worldwide are using social media, and many schools and education systems are using social media such as Facebook, Twitter and Instagram to connect with students, parents and the general public. However, the level of adoption of technology in school management can vary greatly depending on factors such as geography, infrastructure and resource availability. In some countries and regions, access to technology and digital infrastructure remains limited, making it difficult for schools to adopt and use technology effectively [8].

The level of technology adoption in school management in Africa is still relatively low compared to other regions of the world. Although there are many initiatives to promote the use of technology in education, many schools in Africa still lack the necessary infrastructure, resources and training to adopt and use technology effectively. One of the major challenges in introducing technology in school management in Africa is the lack of access to reliable internet connectivity and digital infrastructure. According to a World Bank report, only 24% of Africa's population had access to the internet in 2019, and many schools lack the necessary hardware and software to support online learning and digital communication. Another challenge is the lack of trained staff to support the use of technology in education. Many teachers in Africa have limited training and experience in the use of technology, which can hinder their ability to effectively integrate technology into their teaching and management practices [9].

Despite these challenges, there are many initiatives to promote the use of technology in education in Africa. For example, the African Union has launched the Smart Education Initiative, which aims to promote the use of digital technology to improve educational outcomes across the continent. In addition, there are many non-governmental organisations (NGOs) and private sector initiatives working to provide schools in Africa with the necessary hardware, software and training to adopt and effectively use technology. It is worth noting that the COVID-19 pandemic has accelerated the adoption of technology in school management worldwide. As schools were forced to close their doors to prevent the virus from spreading, many have turned to online learning and remote communication tools to continue teaching and learning. According to a UNESCO report, as of September 2020, more than 190 countries had closed schools nationwide, affecting more than 1.6 billion students worldwide. The report notes that the pandemic has highlighted the need for schools and education systems to have robust digital infrastructure and technological tools to support learning and teaching [9].

Ghana has made significant progress in recent years in adopting technology for school management. The Government of Ghana has recognized the importance of technology in improving educational outcomes and has launched several initiatives to encourage the use of technology in schools. One such initiative is the Ghana Education Service (GES) e-learning platform, which was launched in 2020 in response to the COVID-19 pandemic. The platform provides online learning materials and resources for students and teachers, and serves as a platform for communication and collaboration among stakeholders in the education sector [16].

In addition to the e-learning platform, there are many other initiatives in Ghana to promote the use of technology in education. For example, the Ghana Investment Fund for Electronic Communications (GIFEC) has launched a programme to provide schools in rural areas with internet access and digital devices such as laptops and tablets [16]. This programme aims to bridge the digital divide between urban and rural areas and ensure that all students in Ghana have access to digital learning resources. There are also many private sector initiatives to promote the use of technology in education in Ghana. For example, in recent years, several edtech start-ups have emerged in Ghana offering digital learning resources, teacher training and school management tools [16].

Despite these initiatives, Ghana still faces challenges in adopting technology for school management. Lack of reliable internet connectivity in some areas and limited resources available to schools in rural areas can hinder the effective adoption of technology. In addition, more trained personnel are needed to support the use of technology in education in Ghana. Therefore, technology is being widely used to manage schools around the world.

1.2. Analytical Lens: Technology Acceptance Theory (TAT)
TAT is a model that explains the process by which people and organisations adopt new technologies. It argues that five factors influence the process of technology acceptance: relative advantage, compatibility, complexity, triability and observability [17, 18]. Relative advantage refers to the extent to which a new technology is perceived to be better than an existing technology. Compatibility refers to the extent to which the new technology is consistent with the values, norms and experiences of potential users. Complexity refers to the extent to which the new technology is perceived to be difficult to understand and use. Trialability refers to the extent to which potential users can experiment with a new technology before deciding to adopt it. Finally, observability refers to the extent to which the benefits of a new technology are visible to other [19]. According to people and organisations adopt new technologies sequentially, going through several stages, including awareness, interest, evaluation, trial and acceptance. Acceptance occurs when people or organisations decide to fully use the new technology [20].

TAT is a valuable framework for understanding the factors that influence the adoption of new technologies. By considering the relative merits, compatibility, complexity, testability and observability of a technology, organisations can develop strategies to facilitate its adoption. The TAT framework emphasises the importance of considering the needs and perceptions of potential users when introducing new technologies and by considering the factors that influence adoption, organisations can develop effective strategies to promote the adoption and use of new technologies.

However, this theory has been criticised for a number of reasons. One major criticism is that TAT tends to oversimplify the adoption process and ignore the social and cultural factors that influence the use of technology [21]. Orlikowski argues that TAT assumes a rational and individualistic approach to technology adoption that does not consider the power dynamics and social structures that determine the use of technology in organisations. This approach overlooks the role of social actors in shaping technology adoption and fails to recognise the importance of social and cultural context in shaping technology use. Another criticism of TAT is that it does not adequately account for the continuum of technology use and how it evolves over time [22]. TAT focuses on the initial implementation process and does not consider how the use of the technology is shaped by current social and organisational practices. In addition, TAT has been criticised for failing to consider the political and economic forces that determine technology adoption and use [23]. These criticisms suggest that TAT is overly focused on individual behaviour and ignores the wider societal and institutional factors that influence the use of technology.

Despite these criticisms, the researcher found the theory relevant for this study. By considering the factors that influence technology adoption, TAT provided a useful framework for understanding how and why school head teachers need to adopt and use ICT for management purposes. TAT emphasizes the importance of relative advantage, or the extent to which new technology is perceived to be better than existing technology. In the context of school management, this may include consideration of the advantages of using ICT over traditional paper-based methods, such as increased efficiency, accuracy and availability of data. TAT also stresses the importance of compatibility, or the extent to which the new technology is consistent with the values, norms and experiences of potential users. In the context of school management, this may include consideration of how ICT aligns with school goals and values, as well as with the technical and organisational capabilities of head teachers. By looking at compatibility, the theory helped the researcher to better understand the social and cultural factors that determine the adoption and use of ICT in school management by head teachers. The theory, however, did not provide a framework for understanding why technology could be adopted by organizations, in this case schools, while at the same time not being used by school head teachers in performing tasks. Therefore, in addition to technology acceptance theory, Task-Technology Fit theory was adopted.

2. Methods and Materials

The study adopted a mixed method approach using an explanatory sequential design where quantitative data were first gathered using questionnaires and analysed using descriptive statistics with the help of the Statistical Package for Social Sciences (SPSS) version 22.0 and then interview guides were developed based on the results of the quantitative analysis to collect qualitative data and analysed for triangulation purposes. Two hundred and forty head teachers were selected to participate in the survey using simple random sampling technique while ten deputy directors of education were selected from the Municipal

and Regional Education Directorate situated in Wa Township to take part in Key Informant Interviews (KII).

Two main instruments were used. Questionnaire and Interview guide. Those who took part in the survey were administered with questionnaires while the interview guide was used for the KII. The questionnaire was self-administered since participants could read and write. The questionnaire was divided into five sections. The first consisted of six items which solicited data on the demographic characteristics of the respondents. The second section consisted of 9 items which solicited data on the current levels of ICT use by head teachers in school management in Wa Municipal. The third section had 10 items which solicited data on the impact of ICT use on the effectiveness of head teachers in school management in Wa Municipality.

The fourth had 8 items which aided the researcher to gather data on the challenges faced by head teachers in using ICT for school management. The fifth section had 9 items which solicited data on the strategies of improving ICT use in school management by head teachers in Wa Municpal. The Interview guide solicited data on the ICT skills of head teachers what the Ghana Education Service as an institution is doing to help head teachers better adopt ICT use in school management and the avenues accessible to teachers in terms of refining their ICT skills to better adopt ICT in school management.

The data collection instruments were pre-tested in Bole District which share similar characteristics with the Wa Municipal. After designing the questionnaire, it was essential for the researcher to establish its appropriateness and applicability before the commencement of the actual data collection. The researcher conducted a pilot testing of the questionnaire with twenty head teachers of Basic schools in the Bole District. This testing was performed to ensure that there is no ambiguity in the questionnaires and to identify questions that were not necessary. The instruments were also peer reviewed my colleagues and their review comments were incorporated before the final questionnaires were issued to participants.

Both quantitative and qualitative data were gathered around all the objectives of the study. The quantitative data were analysed using simple quantitative tools with the help of SPSS. The analyses were largely descriptive and descriptive statistics such as frequencies, percentages, minimum and maximum values were used and these were presented in tables and charts. Qualitative data were analysed using inductive thematic analysis where codes were generated and transformed into themes and the themes were used interpreted in to answer the research questions. The results of the two analyses were compared and contrasted for cross validation purposes before discussing the findings.

The study involved human subjects and so key ethical considerations were made. First of all the researcher ensured that the study was conducted within the University's acceptable means of conducting research and so ethical clearance was obtained from the University's Research and Ethics Committee.

As a method of community entry, appropriate permission was obtained from the Metropolitan Director of Education and the various Circuit Supervisors whose teachers were recruited for the study. Informed consent was obtained from the participants before being recruited to participate in the study. Steps were taken to ensure the information given by participants was kept in utmost confidentiality while their anonymity was ensured throughout the study and in the report.

3. Results
3.1. Level of ICT Use in School Management by Head Teachers

Participants reported using ICT for various other tasks, as summarized in Table 1. According to Table 5, the primary task for which head teachers utilize ICT is salary validation. A significant majority of participants, 191 (78.9%), reported using ICT for this task all the time, while only 4 (1.7) stated that they never use ICT for salary validation. Participants also mentioned several other tasks in which they employ ICT. Among them, 22 (9.1%) reported using ICT for task performance consistently, 165 (68.2%) stated that they sometimes use ICT for student registration, 14 (5.8%) indicated occasional usage, and only

41 (16.9%) reported never using ICT at all. This indicates that most head teachers use ICT for student registration, although not always. While the number of participants who never use ICT was lower, it is still significant, highlighting the need for further training to ensure widespread adoption of ICT for student registration.

Regarding the adoption of ICT in keeping student records, 25 participants (10.3%) reported using ICT for this purpose all the time, while 81 (33.5%) and 95 (39.3%) reported using it sometimes and occasionally, respectively. Additionally, 41 participants (16.9%) reported never using any ICT tool for keeping student records. For staff record keeping, 44 (18.2%) participants stated that they use ICT all the time, 123 (50.8%) reported using it sometimes, 37 (15.3%) mentioned occasional usage, and 38 (15.7%) stated that they never use ICT for staff record keeping. Regarding monitoring student attendance, 17 (7.0%) participants reported using ICT for this task all the time, 53 (21.5%) mentioned occasional usage, 75 (32.0%) reported using it occasionally, and only 38 (15.7%) stated that they never use ICT at all for monitoring attendance

Statements	All the time	Sometimes	Occasionally	Never at all
Students' registration	22 (9.1%)	165(68.2%)	14 (5.8%)	41 (16.9%)
Keeping students records	25 (10.3%)	81(33.5%)	95(39.3%)	41(16.9%)
Keeping staff records	44 (18.2%)	123(50.8%)	37(15.3%)	38(15.7%)
Monitoring attendance	17 (7.0%)	52(21.5%)	75(31.0%)	98(40.5%)
Monitoring teacher punctuality	7 (2.9%)	72(29.8%)	72(29.8%)	91(37.6%)
Monitoring teacher absenteeism	14 (5.8%)	70(28.9%)	42(17.4%)	116(47.9%)
Reviewing lesson plans	14 (5.8%)	69(28.5%)	88(36.4%)	71(29.3%)
Allocating functions to staff	24 (9.9%)	87(35.9%)	51(21.1%)	80(33.1%)
Writing reports	37 (15.3%)	85(35.1%)	55(22.7%)	65(26.9%)
communicating to staff	39 (16.1%)	64(26.4%)	75(31.0%)	64(26.4%)
Organizing PTA meetings	26 (10.7%)	59(24.4%)	61(25.2%)	96(39.7%)
Salary validation	191(78.9%)	25(10.3%)	22 (9.1%)	4(1.7%)
Source: Field Data, 2023				

Table 1: Level of ICT Use by Head Teachers in School Management

The findings imply that there is a relatively high level of ICT adoption for task performance among head teachers in Wa. The majority of participants reported using ICT for various tasks, including salary validation, student registration, keeping student records, and monitoring student attendance. A significant percentage of head teachers stated that they use ICT either all the time or sometimes for these tasks. However, it is important to note that there are still head teachers who reported never using ICT for certain tasks, particularly in keeping student records and monitoring staff attendance. This indicates that there is room for improvement and further efforts are needed to ensure that all head teachers embrace and consistently utilize ICT for these tasks. These findings were corroborated by the responses from the KII. One of them explained to us as this:

"Head teachers are increasingly using ICT nowadays and this is good for us. They must validate their teachers for salary payment

and this is done electronically" (Statement from a 45-year-old Deputy Director of Education, Wa, 2023)
Another also explained

"They are doing their best. They naturally have to validate salaries and this is done online. They also do registration using computers. They keep both staff and students' records. Tehy send official reports to us and also pass official communication from the directorate to their teachers using new technologies. We are adopting ICT use gradually" (Interview with a 46-year-old Deputy Director, WA, 2023).

These responses suggest that head teachers in WA are actively adopting ICT and gradually integrating it into their work practices. This signifies a positive trend towards embracing technology to improve task performance and enhance administrative processes within schools. The headmaster mentioned several

tasks where ICT is being utilized, including salary validation, registration, record-keeping for both staff and students, sending official reports, and facilitating official communication from the directorate. These activities indicate that head teachers are gradually incorporating ICT into their daily work processes. It further indicates that head teachers are making efforts to embrace ICT tools and technologies to improve their efficiency and effectiveness in performing various tasks. They recognize the value of utilizing ICT for tasks such as salary validation and registration, which are essential administrative processes in schools. Additionally, the adoption of ICT for record-keeping indicates a shift towards digital management systems, enhancing data accuracy, accessibility, and organization. The mention of sending official reports and facilitating communication through ICT implies that head teachers are utilizing digital platforms to streamline communication channels within the school system. This indicates a willingness to leverage ICT for administrative purposes, facilitating timely and efficient exchange of information.

3.1. Impact of ICT Use on the Effectiveness and Efficiency of School Management by Head Teachers

The analysis revealed different perceptions of participants on how the use of ICT tools impact on their effectiveness and efficiency as indicated in Table 2. Many of the participants (32.2%) strongly agreed that ICT tools improve communication

with staff. This means that with the advent of ICT, head teachers are able to easily pass information across to their staff with much ease. Just 2.5% and 10.3% disagreed and strongly disagreed with this statement. Indicating that majority of the participants was of the view that ICT improves communication with staff. Many of the participants (31.8%) also strongly agreed that the use of ICT serve to preserve official document. Just 1.7% and 8.7% disagreed and strongly disagreed with this statement indicating that head teachers perceive the ability of ICT tools to preserve official document and aid its easy retrieval as a strong enabler of their effectiveness and efficiency as head teachers. This makes the task of record keeping a lot easier. In terms of organizing staff and Parents Teachers Association (PTA) meetings, many of the respondents 35.5% and 24.0% indicated agreed and strongly agreed that the use of ICT makes the organization of such meetings a lot easier. In terms of creating time for other tasks, 27.7% and 24.8% of the respondents agreed and strongly agreed respectively that the use of ICT gives them time to attend to other tasks thereby impacting their effectiveness and efficiency. Although with this, a good number (38.0%) could not say whether ICT creates time for them to attend to other tasks or not, this number in addition to those who disagreed and strongly disagreed, 7.9% and 1.7%, respectively, did not equal those who agreed and strongly agreed. It, however, draws attention to the fact that many head teachers are yet to begin to appreciate the relevance of ICT use in school management.

Statements	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Task completed in time	4 (1.7%)	21 (8.7%)	76 (31.4%)	71 (29.3%)	70 (28.9%)
Writing reports becomes much easier	10 (4.1%)	11 (4.5%)	49 (20.2%)	126 (52.1%)	46 (19.0%)
There is adequate time to attend to other tasks	4 (1.7%)	19 (7.9%)	92 (38.0%)	67 (27.7%)	60 (24.8%)
Organizing meetings is faster	3 (1.2%)	37 (15.3%)	58 (24.0%)	86 (35.5%)	58 (24.0%)
Communication with staff improves	6 (2.5%)	25 (10.3%)	78 (32.2%)	55 (22.7%)	78 (32.2%)
Official documents are better secured	4 (1.7%)	20 (8.3%)	36 (14.9%)	107 (44.2%)	75 (31.0%)
Records are better preserve	4 (1.7%)	16 (6.6%)	87 (36.0%)	70 (28.9%)	65 (26.9%)
Preserved documents are easily retrieved	7 (2.9%)	21 (8.7%)	36 (14.9%)	101 (41.7%)	77 (31.8%)
Many tasks can be accomplished in shorter time	4 (1.7%)	16 (6.6%)	51 (21.1%)	123 (50.8%)	48 (19.8%)
Privacy of staff and students records	14 (5.8%)	66 (27.3%)	43 (17.8%)	57 (23.6%)	62 (25.6%)
Source: Field Data, 2023					

Table 2: Impact of ICT Use on the Effectiveness and Efficiency of School Management by Head Teachers

Related to this was the issue of multi-tasking. Majority of the participants (50.8% and 25.6%) agreed and strongly agreed respectively that the use of ICT tools enabled them to perform several tasks at the same time thereby increasing their efficiency. In just as in the earlier cases discuss, in this case too, a good number of the participants (21.1%) could not say if the use of ICT enabled them to multi-tas indicating that they are unable to tell the impact of ICT use on their effectiveness and efficiency, further pointing to the conclusion that they never employed

ICT in task performance. As indicated in Table 2, participants indicated various levels of impact of ICT on all sub-scales and all point to the direction that the use of ICT positively impacted their effectiveness and efficiency as teachers. An increasing number of those who could not tell if the use of ICT impacted their performance or not points to the conclusion that many head teachers are yet to adopt ICT use in school management hence their inability to appreciate its impact on their performance and effectiveness.

The findings that ICT use positively influence head teacher's effectiveness and efficiency was corroborated by the partipants who took part in the interviews. One of the narrated the impact of ICT use on his effectiveness and efficiency as this:

"ICT has significantly improved the management of schools, making it easier, more effective, and efficient. In the past, communication was a challenge, but now a simple message on a common social media platform is sufficient. Salary validation can be accomplished with just a click of a button, ensuring accuracy and efficiency. School records are now stored in a safer and more presentable digital format, eliminating the need for physical paperwork. Organizing meetings has become much simpler with the aid of ICT tools." (Interview with a 44 year-year-old head teacher in Wa, 2023).

The statement suggests that the use of ICT by head teachers has brought about significant improvements in their effectiveness and efficiency in school management. The analyses of both the qualitative and quantitative data point to the conclusion that the use of ICT positively influence head teacher's efficiency and effectiveness in school management. However, the significant number of participants who could not say whether or not ICT impacts their performance also point to the conclusion that many head teachers are yet to adopt ICT use in task performance.

3.2. Challenges head teachers faced in using ICT tools in school management

The analyses revealed several challenges head teachers face in the use of ICT (Table 3). A worrying trend was also observed. Many participants could not indicate whether the item mentioned in the questionnaire was a challenge. For instance, 111 participants, constituting 45.9% of the total participants were not sure if issues of technology fitness were a challenge. Another 103 (42.6%) were not sure if inadequate training on the use of some of the ICT tools was a challenge. A hundred and four participants, representing 43.0% of the total participants were not sure if lack of electricity was a challenge in the use of ICT. Having a large number of participants express a lack of certainty about their knowledge of the challenges in the use of ICT is indicative of the conclusion that many of the head teachers are yet to appreciate the use of ICT in school management.

A significant number of participants in the study expressed their perceptions of the challenges associated with the adoption and use of ICT in task performance. Out of the total participants, 108 (44.6%) highlighted the lack of state support as a major hindrance to the adoption and utilization of ICT tools. Financial constraints prevent many teachers from purchasing these tools, emphasizing the need for assistance from the government or relevant authorities. Another key challenge identified by 103 participants

(42.6%) was the inadequate internet infrastructure in schools. The lack of reliable and accessible internet connections poses a significant barrier to the effective adoption of ICT in school management by head teachers. Without proper internet access, utilizing ICT tools becomes difficult and limits their potential benefits. Moreover, several other challenges were acknowledged by the participants. These included inadequate training (36.4%), insufficient ICT skills among teachers (33.1%), difficulties associated with using certain ICT tools (32.2%), low technology adoption by community members (34.7%), and the high cost of obtaining ICT tools (31.0%). These factors collectively contribute to the challenges faced by head teachers in utilizing ICT tools for school management.

The findings suggest that addressing these challenges is crucial for promoting the effective use of ICT in schools. It highlights the importance of providing support, both in terms of financial resources and training, to ensure that teachers have the necessary skills and resources to effectively utilize ICT tools. Additionally, it highlights the need to improve internet infrastructure in schools to enable seamless connectivity and maximize the benefits of ICT in enhancing school management practices.

The finding from the analysis of the quantitative data was corroborated by the key informants who partook in the key informant interviews.

One of them explained the challenges faced by head teachers in using ICT tools in school management as this:
"There are numerous challenges that we face. Many of us completed our education before the widespread proliferation of ICT tools in Ghana. As a result, we did not receive formal training on their usage and had to learn through trial and error or with the help of friends. The cost of acquiring these tools can be significant, especially considering the relatively modest salaries of teachers. Even if we manage to afford them, the availability and reliability of electricity and internet connectivity remain persistent challenges."

The statement highlights the challenges faced by head teachers in adopting and utilizing ICT tools for their work. Many head teachers did not receive formal training on ICT due to the timing of their education, as these tools became more prevalent after they had completed their studies. Consequently, they had to rely on self-learning or seek assistance from their peers to acquire ICT skills. Financial constraints pose a significant challenge, as the cost of purchasing ICT tools can be substantial compared to teachers' salaries. Even when teachers manage to afford these tools, the statement emphasizes that consistent access to electricity and reliable internet connectivity are additional obstacles that hinder their effective usage.

Statements	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Inadequate ICT skills by head teachers	32 (13.2%)	68(28.1%)	62(25.6%)	80(33.1%)	0(0.00)
Issues of task technology fitness	17 (7.0%)	67(27.7%)	111(45.9%)	39(16.1%)	8(3.4%)
The difficulties involved in using some of the tools	30(12.4%)	51(21.1%)	80(33.1%)	78(32.2%)	3(1.2%)
Inadequate training on the use of some the tools	12(5.0%)	29(12.0%)	103(42.6%)	88(36.4%)	10(4.1%)
Poor internet infrastructure		40(16.5%)	88(36.4%)	103(42.6%)	11(4.5%)
Inadequate ICT skills by teachers and education managers	24(9.9%)	59(24.4%)	59(24.4%)	97(40.1%)	3(1.2%)
Levels of technology use by community members	25(10.3%)	45(18.6%)	84(34.7%)	85(35.1%)	3(1.2%)
Access to electricity	10(4.1%)	32(13.2%)	104(43.0%)	93(38.4%)	3(1.2%)
Cost of obtaining some ICT tools	15(6.2%)	43(17.8%)	75(31.0%)	106(43.8%)	3(1.2%)
Limited state support in terms of ICT use by the head teachers	23(9.5%)	40(16.5%)	63(26.0%)	108(44.6%)	8(3.4%)
Source: Field Data, 2023					

Table 3: Challenges head teachers faced in using ICT tools in school management

The combined quantitative and qualitative findings suggest that head teachers face several challenges in using ICT for school management. These challenges include a lack of formal training and skills in ICT, financial constraints that hinder access to ICT tools, inadequate internet infrastructure, unreliable electricity supply, and difficulties associated with specific ICT tools. This therefore requires therefore, underscore the need for comprehensive training programs, addressing financial barriers, and improving infrastructure to support teachers in adopting and utilising ICT tools effectively for their work in school management.

4. Discussion of Findings

The study reveals a positive trend in ICT integration within school management by head teachers in WA. Their active adoption of ICT showcases a proactive embrace of technology for tasks like student registration, record-keeping, communication, and report writing, demonstrating a willingness to harness ICT's potential benefits in enhancing efficiency and streamlining administrative processes. Furthermore, the gradual integration of ICT underscores a thoughtful approach, allowing for a systematic incorporation of ICT tools into existing management practices, reflecting recognition of technology's value in enhancing effectiveness. These findings align with existing literature highlighting the gradual integration of ICT tools in task performance in educational settings even though this study pays particular attention to integrating ICT into school management practices by head teachers within the specific context of Wa Municipal. The active adoption and gradual integration of ICT into school management as found by this study also aligns with the Technology Acceptance Theory (TAT), showcasing the perceived usefulness and ease of use of ICT tools, indicating a belief in the positive impact of technology on school management practices [6, 24, 25, 7].

The study also found a favourable impact of ICT usage on the efficiency and effectiveness of head teachers in school management, validated through both qualitative and quantitative data analyses. The results indicate that head teachers employing ICT tools experience improved efficiency through streamlined processes, enhanced communication, and more effective task execution. This outcome is consistent with the findings of many studies which investigated the impact of ICT adoption on employee effectiveness [6, 3, 26]. Unique to this study, however, is the specific focus on the effectiveness of head teachers who incorporate ICT use in school management tasks. The study found that ICT integration enhanced leadership practices, bolstered efficiency in administrative tasks, and facilitated effective communication within schools. The head teachers highlighted the positive impact of ICT on communication, administrative tasks, and meeting organisation. With the ease of communication through digital platforms, such as social media, head teachers can engage in efficient and effective information exchange, enhancing collaboration among staff members. Additionally, the automation of administrative processes, such as salary validation and record-keeping, streamlines workflows, saving time and effort. This enables head teachers to allocate their energy towards more strategic and value-added activities, ultimately increasing their overall effectiveness in managing the school. Furthermore, ICT facilitates the organization of meetings by simplifying logistical aspects, allowing for efficient scheduling, coordination, and sharing of materials. However, the finding also highlights the need for adequate ICT infrastructure to fully realize the potential benefits of technology in enhancing effectiveness and efficiency. These findings corroborate with existing literature on ICT use and task performance even though such studies did not pay particular attention to school management practices within the Wa Municipal [3, 1, 7].

It was also found that a considerable number of participants were unsure about ICT's impact on their performance, suggesting that many head teachers have not fully embraced ICT in their daily routines. This is also consistent with existing literature on ICT adoption in task performance [6, 3, 25, 7]. It also

aligns with the tenets of TAT. The TAT posits that individuals' uncertainty or hesitation about technology adoption stems from their unfamiliarity or lack of experience with the technology in question [20]. In this context, head teachers' uncertainty regarding ICT's impact implies a potential lack of exposure or familiarity with ICT tools in their routine activities. This lack of familiarity can deter the complete embrace and integration of ICT into their daily practices, aligning with the TAT's premise that uncertainty hampers technology adoption. This indicates a need for intensified efforts to promote ICT adoption, provide training and support, and raise awareness of the potential benefits of ICT use in school management.

The study further found multiple challenges faced by head teachers regarding ICT utilization for school management. One major challenge is the lack of formal training and skills, indicating that head teachers have not received adequate training to effectively leverage ICT tools for school administration, hindering their optimal utilization and integration into management processes. Financial constraints pose another significant obstacle, limiting head teachers' ability to acquire essential ICT tools due to insufficient funds, impeding the streamlining of administrative tasks and improving overall efficiency. Inadequate internet infrastructure was also found to affect effective communication, information retrieval, and collaboration, directly impacting the perceived usefulness of ICT for school management. Furthermore, unreliable electricity supply was found to disrupt consistent ICT tool usage, hindering effective school management. Additionally, the user-unfriendly nature of some ICT tools posed challenges to some head teachers, making it difficult for head teachers to navigate and effectively use these technologies designed for school management, ultimately affecting their adoption and utilization. These findings align with existing literature, emphasizing the importance of training, financial support, reliable infrastructure, and user-friendly ICT tools to facilitate successful ICT integration into school management [1, 25, 7]. It also aligns with the basic tenets of TAT. TAT posits that users are more inclined to adopt technology perceived as useful and easy to use; hence, improving these aspects is vital for effective ICT adoption in school management [20]. Addressing financial barriers and enhancing ICT user-friendliness can boost perceived usefulness and ease of use, promoting successful integration of ICT in school management processes.

5. Conclusion and Recommendations
This study sheds light on the dynamics of integrating Information and Communication Technologies (ICT) into school management, particularly focusing on the challenges and potential solutions. The findings demonstrate a growing awareness and acceptance of ICT's potential in enhancing efficiency and effectiveness within school management. However, substantial hurdles exist, including a lack of formal training and skills in ICT, financial constraints, inadequate internet infrastructure, unreliable electricity supply, and difficulties with user-unfriendly ICT tools. These obstacles hinder the seamless integration of ICT into school management processes, limiting the realization of its full benefits. Drawing upon established theoretical

frameworks like the Technology Acceptance Theory (TAT), the study emphasizes the importance of perceived usefulness and ease of use in promoting ICT adoption. Addressing these challenges necessitates tailored training programs, effective allocation of financial resources, improved infrastructure, and user-centric ICT tool design. By overcoming these impediments and leveraging the potential of ICT, schools can enhance administrative efficiency, communication, and overall effectiveness in managing educational institutions, ultimately contributing to an improved learning environment for students.

The integration of Information and Communication Technologies (ICT) into school management holds significant implications for modern educational institutions. First and foremost, it leads to heightened efficiency and productivity within schools by automating administrative tasks like record-keeping and communication. This, in turn, allows school staff to allocate more time to providing quality education. ICT also facilitates improved communication and collaboration among various stakeholders, including teachers, students, parents, and administrators. The access to a wide array of educational resources, including e-books, online courses, and research databases, enriches the learning experience for both educators and learners. Moreover, ICT promotes data-driven decision-making by enabling the collection and analysis of crucial educational metrics, aiding school management in making informed choices to enhance teaching and learning outcomes. Despite initial investments, integrating ICT can result in long-term financial savings by reducing administrative expenses and minimizing errors in financial transactions. It's crucial to address challenges such as inadequate training, financial constraints, unreliable infrastructure, and user-unfriendly ICT tools to realize the full potential of ICT in school management. Overall, integrating ICT into school management holds the promise of revolutionizing education by optimizing processes, fostering collaboration, enabling data-driven decision-making, and preparing students for a technology-driven future. However, addressing associated challenges and ensuring equitable access and training is essential for maximizing these benefits across educational settings

Base on the findings of the study, the following recommendations are made:
• Addressing the lack of formal training and skills in ICT among head teachers is crucial. It is therefore recommended that the Ghana Education Service develop comprehensive and on-going training programs tailored to the specific needs of head teachers, focusing on ICT tools relevant to school management.
• To tackle financial constraints, we recommend that the Municipal and Regional Education Directorates in Wa should strategically resource allocate resources and also seek external funding opportunities by exploring grants and partnerships with tech companies to enhance ICT infrastructure in schools within the Municipal and beyond.
• Lastly, addressing the user-unfriendliness of ICT tools is pivotal. We recommend that the Ghana Education Service should ensure that feedback mechanisms is created between tech developers and education stakeholders so as to gather insights from head

teachers and other school staff regarding their experiences with existing ICT tools, identifying pain points, and subsequently incorporating user-centred design principles to improve the usability of these tools.

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