

UNIVERSITY OF EDUCATION, WINNEBA

**WILLINGNESS OF BASIC SCHOOL TEACHERS TO ADOPT
INFORMATION COMMUNICATION AND TECHNOLOGY TOOLS FOR
TEACHING IN CLASSROOMS**

ELIZABETH KLU



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TEACHING IN CLASSROOMS**

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to the School of Graduate Studies in partial fulfillment of
the requirements for the award of the degree
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FEBRUARY, 2023

DECLARATION

Student's Declaration

I, Elizabeth Klu declare that the dissertation, with the exception of quotations and references contained in published works which have all being identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole for another degree elsewhere.

Signature:

Date:



Supervisor's Declaration

I hereby declare that the preparation and presentation of this work was supervised by me in accordance with the guidelines for the supervision of Dissertation laid down by the University of Education, Winneba.

Name of Supervisor:

Signature:

Date:

DEDICATION

I dedicate this work to my dearest mother, the late Rev. Mrs. Olivia Nego Klu and my spiritual father, Prophet Bernard Owusu-Ansah.



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I am most grateful to the Almighty God for His grace and mercies which has made it possible for me to complete this work. I also wish to acknowledge with gratitude, the encouragement, corrections and guidance given to me by Professor Owusu Mensah my supervisor for this work to be completed.

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Finally, I wish to express my gratitude to all those who helped in diverse ways throughout the entire work for their criticism, encouragement and corrections. Special thanks to my late mother who encouraged me to take up this course.

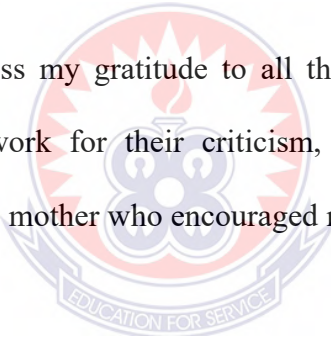


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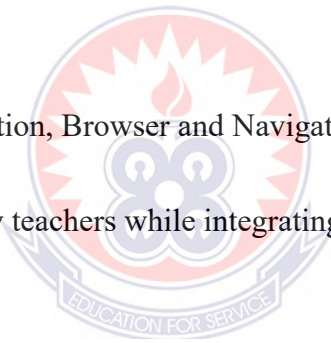
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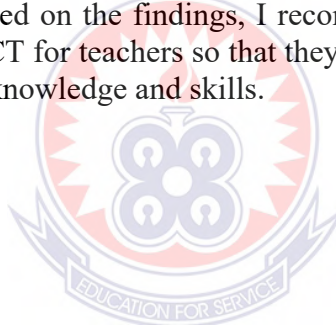
GLOSSARY

GES	Ghana Education Service
GSS	Ghana Statistical Services
ICT	Information, Communication and Technology
TAM	Technology Acceptance Model



ABSTRACT

Since the dawn of the twenty-first century, ICT have been the most important technological tool for changing the global economy and causing rapid social change. The use of ICT creates a dynamic and proactive teaching and learning environment. The purpose of this study was to assess teacher's willingness to adopt ICT tools for teaching at the basic level. To ascertain this, a cross-sectional study was conducted in among primary school teachers. 348 basic school teachers were interviewed. The researcher personally administered the questionnaire to the teachers. STATA 17.0 was used for data analysis after cleaning the data. Descriptive analysis was performed on the data and, the final results presented in charts and tables. The mean age of respondents was 28.5 ± 4.4 years. Desktop computers were moderately available in most (251, 72.1%) of the respondents' schools. 48% of the basic school teachers use ICT facilities in teaching and learning in classrooms while 52% do not. 240 (69.0%) of the study participants said maintenance issues have rendered the computers in their schools not accessible to the teachers as well as students. 63 (18.1%) mentioned unstable electricity as a challenge. ICT infrastructure are moderately available in basic schools in urban areas however, the basic school teachers do not use them in lessons delivery in classrooms. This was attributed to challenges such as low internet connectivity, poor funding, maintenance issues, unstable electricity. Based on the findings, I recommend that GES should organize regular workshops on ICT for teachers so that they become familiar with the modern pedagogy of imparting knowledge and skills.



CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Electronic media and information technologies have transformed the world into a "global village." Because of its widespread use, information and communication technology (ICT) has made society increasingly complex. Furthermore, the presence and use of ICT is a decisive element in defining a nation's degree of development. South Korea, Hong Kong, Singapore, and Taiwan, which were once considered "third world" countries, have risen to the top of the world because to their successful usage of ICT. People in those countries use ICT to create gadgets that help them solve some of their societal problems and thereby improve their standard of living (Fleischer, 2015).

Since the dawn of the twenty-first century, information and communication technologies (ICT) have been the most important technological tool for changing the global economy and causing rapid social change. It has also altered the nature of education, including where and how learning occurs, as well as the role of students in the teaching and learning process (Banji et al., 2020). The use of information and communication technology (ICT) creates a dynamic and proactive teaching and learning environment. As a result, teachers are seen as crucial players in implementing ICT in their classrooms on a regular basis, as they educate pupils for the digital era (Ghavifekr et al., 2012). However, the advantages and challenges are increasingly being debated. As a result, some developing countries have

implemented governmental policies targeted at boosting ICT and ensuring its integrity in schools. (Banji et al., 2020).

Ghana was one of the first developing countries to adopt policies to encourage the use of ICT in schools, with the first policy being implemented in 2003. The policy was reviewed three times between 2006 and 2008, culminating in a document that was adopted in 2015. The objective of the ICT in Education Policy, according to the Ministry of Education, was to incorporate ICT tools into the curriculum for all subjects and at all levels of education in Ghana. Its overarching purpose was to enable all Ghanaians, including instructors and students in formal, informal, and non-formal educational institutions, to use ICT tools and resources to build the necessary skills and knowledge to be active participants in the global knowledge economy at all times. The strategy aimed to use ICT tools to help teachers and students in Ghana's educational system, as well as to encourage e-learning (Banji et al., 2020).

In schools, information and communication technologies (ICTs) such as the internet, PCs, and mobile devices such as phones, tablets, and laptops are utilized to improve access to and dissemination of teaching and learning materials. ICT can help developing countries achieve Goal 4 of the United Nations Sustainable Development Goals (SDGs), which is to ensure that excellent education is available at all levels of schooling and to close the digital divide (Ampiah et al., 2007), especially in education, where these pupils can gain access to secondary learning materials, as well as hard-copy textbooks, which are still the preferred primary sources (Mwapwele et al., 2019).

ICTs considerably simplify the acquisition and absorption of knowledge, providing developing countries with unprecedented chances to strengthen educational systems, improve policy development and implementation, and expand the spectrum of commercial and poor options. One of the most difficult challenges faced by the impoverished, as well as many people living in the world's poorest countries, is their sense of isolation, and ICTs can open up access to knowledge in previously unimaginable ways (Mikre, 2011). According to Adarkwah (2021), ICT in education improves student learning, gives education to pupils who otherwise would not have had access to it, aids in teacher training, increases the skilled workforce, and promotes social mobility. It is also seen as necessary for high-quality higher education. ICT has the power to improve learning, make a subject more engaging, and make problem-solving, communication, research, and decision-making processes easier (Hong, 2016). ICT is a predictor of pupils' academic achievement in math, science, and reading. ICT also makes teaching and e-learning easier, thereby having a favourable impact on teaching, learning, and research (Waluyo, 2019).

Despite the numerous advantages of ICT in education, certain difficulties limit its use, particularly in poor nations such as Ghana. High costs, insufficient infrastructure, a lack of ICT skills, tutors' rejection of e-learning, and lack of access to a reliable internet connection and electricity are only a few of the issues associated with ICT in education (Adarkwah, 2021).

Both industrialized and developing countries have recognized the value of ICT in education, particularly at the primary level. As a result, this study was purported to assess teachers' readiness to use ICT tools in classrooms at the basic school level in Ashaiman, Greater-Accra, Ghana.

1.2 Problem statement

The integration of ICT tools into classroom teaching has become increasingly essential in the modern educational landscape, offering opportunities to enhance the quality of education and engage students effectively (Nwachukwu, 2017). However, there exists a significant gap in our understanding of the willingness of basic school teachers to adopt ICT tools for teaching in classrooms in Ashaiman. While technology continues to evolve and permeate various aspects of society, it is crucial to investigate the factors influencing the willingness of basic school teachers to embrace ICT tools and explore potential barriers that may hinder their adoption (Albion, 2015; Ertmer, Ottenbreit-Leftwich, & Tondeur, 2015).

The Akuffo-led administration, which was elected on a campaign promise to improve access to school and learning outcomes, has made educational reform a top priority. In September 2017, the government announced the Free Senior High School (SHS) policy. This was followed by a slew of reforms in 2019 aimed at improving teacher preparation and establishing a new national curriculum (Oxford Business Group, 2022).

The new curriculum was designed to solve the flaws with the previous one. As a result, the new curriculum was created with the goal of improving the acquisition of reading, writing, arithmetic, and creativity skills across the primary curriculum while also increasing the teaching of Mathematics. In addition, the curriculum aimed to reintroduce themes like Ghanaian history, physical education, and sports as vital components of balanced education and the development of important basic and lifelong skills. In addition, the new curriculum aims to improve French teaching and learning by emphasizing learning-centred pedagogy and strengthening the use of

ICT as a teaching instrument, all while emphasizing pedagogy with an emphasis on equity and inclusion (Ghana Web, 2019).

Ghana's new curriculum has been completely revamped and, with ICT as a pedagogical tool, teaching methodologies have been updated to be more learner-centred. This has spiked arguments among various tutors. While many teachers claimed that the new curriculum would generate a creative, mathematically and scientifically inclined Ghanaian child who would be a critical thinker capable of solving the country's many challenges, others have noted numerous blockages that needs to be addressed (Aboagye & Yawson, 2020).

Despite the fact that the new curriculum represents a step forward, the initiatives have been determined to be unproductive. The school system has a long history of rote learning and memorization, with minimal focus on problem-solving creativity. While ICT has reached the majority of Ghana's schools (especially those in the cities), there are various issues with ICT's adoption and diffusion as part of teaching and learning in Ghana's educational system. The genuine question that needs to be posed and answered is: why aren't instructors using ICT in their classrooms now that accessibility and availability are no longer a problem? (Gyamfi, 2017).

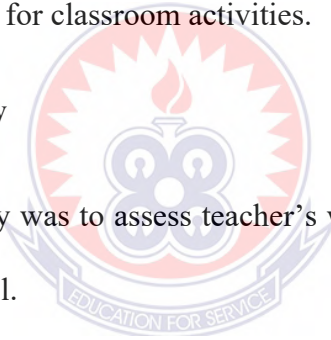
The decision to employ ICT as a pedagogical tool for the new curriculum, for example, appears to be incompatible with Ghana's school infrastructure. Some teachers lack access to a computer network, while others lack access to energy. Because most Ghanaian schools have bigger class sizes, adopting a learner-centred approach will be difficult. In addition, ignoring the society and culture of Ghanaian pupils, as well as the lack of involvement of teachers who may have raised difficulties such as inadequate internet connectivity and lack of energy in the

communities, can hinder the implementation of the new curriculum (Aboagye & Yawson, 2020). Teacher's attitude and beliefs also have an influence on ICT adoption into the classroom (Johnson et al., 2016). Gyamfi (2017) claims that most primary school teachers lack the knowledge and confidence to use ICT tools to convey their lessons since pre-service education does not equip them for adoption and effective integration into their classroom activities.

Moreover, most of the studies conducted on this topic focus on access to ICT infrastructure and use of ICT for classroom activities without considering these teachers' readiness to utilize ICT even if the infrastructure is made available even in remote areas. Therefore, this study focused on the willingness of basic school teachers to use ICT tools for classroom activities.

1.3 Purpose of the study

The purpose of this study was to assess teacher's willingness to adopt ICT tools for teaching at the basic level.



1.4 Specific objectives

1. To assess the availability of ICT facilities in basic schools for teaching and learning.
2. To determine the extent of using ICT in teaching and learning among basic school teachers.
3. To identify the challenges in using ICT in teaching and learning in the classroom.

1.5 Research questions

1. Do the schools have ICT infrastructure?
2. To what extent do teachers use ICT tools in teaching and learning in the classroom?
3. What are the challenges between teachers ICT competencies and readiness level?

1.6 Significance of the study

This study is expected to broaden the knowledge about ICT usage in Ghana and also add to the existing body of literature. It is envisaged that this study will create the awareness of prevailing issues in the schools and possibly serve as a useful document for future educational reforms. This is because, a better understanding of the basic school teachers' attitudes towards the use of the technology can provide essential information for curriculum designers in supporting this new innovation and for policy-makers who are setting new directions for ICT policy. Again, this study is timely and relevant because it focuses on the readiness of basic school teachers to use ICT for pedagogical purpose, a topic considered to be critical for meeting the needs of educational development in Ghana and globally. These findings will improve the use of ICT tools in basic school teaching and learning.

1.7 Delimitations

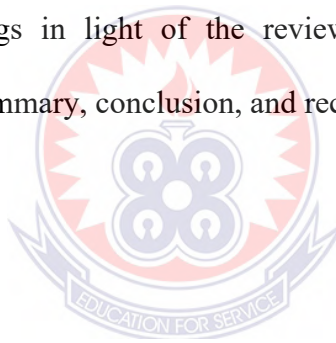
The study's goal was to collect data from basic school teachers in Ashaiman Constituency in the Greater-Accra Region, Ghana. However, the study concentrated on teachers from elementary schools in the constituency. This is because, these teachers require more resources to improve their teaching methods and also to fulfil

the presidential directive. They were chosen again because they must be equipped with ICT skills and techniques. More specifically, to learn from teachers about their perspectives on the use of ICT in content delivery. Finally, to gather information from teachers about some of the barriers to ICT integration for teaching and learning.



1.8 Scope of the study

The study was divided into five chapters. The first chapter covered the study's background, problem statement, purpose, research objectives, research questions, significance, delimitation, and scope. The second chapter was a review of related literature. It included a review of the availability of ICT tools for teaching and learning, the challenges of using ICT for teaching and learning, teacher attitudes toward ICT integration, and other related factors. The third chapter concentrated on methodology, which included the research design, study area, target population, sampling techniques and sample size, data collection procedure, analysis, and ethical considerations. The fourth chapter examined and discussed the collected data's results and key findings in light of the reviewed literature. The fifth chapter presented the study's summary, conclusion, and recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A literature review is an objective, in-depth synthesis and analysis of all relevant research and non-research literature on the topic under consideration. Its goal is to keep the reader up to date on current literature on a topic and to serve as the foundation for another goal, such as justifying future research in the field. A thorough literature review gathers information on a subject from a variety of sources. It is well-written and free of personal biases. It must have a well-defined search and selection method. A well-structured review will improve the flow and readability (Ramdhani et al., 2014).

The use of ICT for teaching and learning in schools has been extensively researched by other researchers all over the world. Related literature was reviewed in relation to this work in order to present the progress of research in the use of ICT for teaching and learning (Boni, 2018). The following themes will be reviewed in the literature: definition of terms, the availability of ICT infrastructure for teaching and learning, the challenges of using ICT for teaching and learning, teachers' attitudes toward the use of ICT, and factors influencing teachers' attitudes toward ICT integration at the basic school level.

2.2 Definition of terms

2.2.1 Basic school

Basic school means a school providing the level of education from kindergarten up to the junior high school level.

2.2.2 Teaching and learning

Teaching and learning process can be defined as a transformation process of knowledge from teachers to students. It is referred as the combination of various elements within the process where an educator identifies and establish the learning objectives and develop teaching resources and implement the teaching and learning strategy. On the other hand, learning is a cardinal factor that a teacher must consider while teaching students (Munna & Kalam, 2021). Learning is a relatively permanent change brought about by developing a new skill, comprehending a scientific law, or altering one's attitude. Learning is a process that is usually initiated on purpose. Other types of learning can occur without any planning, such as through experience. In general, we want to remember and understand why something happens so that we can do it better the next time. Teaching, on the other hand, is a series of events that occur outside of the learners and are intended to support the internal process of learning (Sequeira, 2012).

2.2.3 ICT adoption

Adoption of information and communication technologies (ICTs) is defined as the use of information and communication technologies (ICTs) tools such as computer hardware, software, and networks required for connecting to the internet (Taylor, 2019). ICT adoption can also be defined as an individual's decision to accept or

reject a specific innovation, as well as the extent to which that innovation is integrated into the appropriate context (Corrales & Westhoff (2006), as cited by Jaganathan, 2022).

2.2.4 ICT competency

Competency is defined as a set of knowledge, skills, attitudes, and values required to perform an occupation or productive role effectively. This definition entails observable behaviours that contribute to the successful completion of a task, as well as knowledge, know-how, and the ability to transfer that knowledge. Linking this concept to ICT competencies, the latter are a set of skills, knowledge, and attitudes that are applied to the use of information and communication systems, as well as the devices that the activity entails, and, also the knowledge that people should know and be able to effectively learn and transfer in order to live productively in a digital world (Arturo et al., 2015). UN-APCICT/ESCAP (2016) defined ICT competency as the confidence and critical use of electronic media for work, leisure, and communication. These competencies are related to logical and critical thinking, advanced information management skills, and strong communication abilities.

2.2.5 Willingness

According to the Oxford dictionary, willingness is defined as the quality or state of being prepared to do something

2.3 Availability of ICT infrastructure for teaching and learning

Adoption and integration of ICT in teaching and learning have been hampered by a lack of ICT infrastructure. In developed countries, the average access to ICT infrastructure is one computer for every 15 students, but in Africa, the average

computer student ratio at the college level is 1:45. This low infrastructure ratio cannot support the acquisition of skills in the use of ICT for teaching and learning (Bariu, 2020).

According to Banji, Okyere & Dogbe (2020), most Ghanaian basic school students cannot grasp the concept of ICT since it is been taught in abstract. The authors cited unavailability of ICT learning materials as one of the reasons why these children find difficulty understanding the topic since they do not get the needed practical lessons.

In a study conducted to explore the availability and utilization of information and communication technology facilities for teaching at the basic schools in the Cape Coast North constituency indicated that most of the schools sampled for the study did not have enough computers while others did not even have an ICT lab (Broni, 2017).

Again, another study in the Ga South Municipality showed that most teachers do not have access to computers with rural-urban disparities. Even, the little that had access to computers do not have access to the internet. As such, some teachers access the internet via their wireless modem devices. Roughly 16.67% of teachers had access to internet. Out of the 16.67% of teachers who had access to the internet, 13.89% were in urban schools and 2.78% in rural schools (Sey, 2013).

2.4 Challenges of using ICT for teaching and learning

Teachers' beliefs, school culture, outdated curricula, and traditional teaching methods have all been identified as barriers to the effective use of ICT in education (Bariu, 2020).

In a study by Salam et al. (2018) on impediments to the integration of ICT in public schools of contemporary societies, two forms of challenges were discussed. These were intrinsic and extrinsic impediments. The extrinsic challenges included lack of training/professional development opportunities, lacked technical support, cost of infrastructure, internet issues and curricula issues. The intrinsic challenges impeding ICT integration were lack of time, lack of confidence, resistance to change, lack of accessibility.

In Malaysia, a study revealed that the barriers teachers face while integrating ICT during their lessons include the torn workload on the teachers and a lack of time especially for proper planning. The teaching experience as well as the age of teachers were also revealed to be a barrier. Lack of ICT skills was also cited as a barrier (Raman & Yamat, 2012).

More so, challenges of integration of ICT in education in Nigerian were found to be infrastructure-related barriers, capacity building challenges, lack of technical support specialists, unsteady and inadequate power supply, high cost of ownership, paucity of infrastructure and lack of access, and high cost to consumer (Ogbomo, 2011).

In Ghana, unavailability of computer and its related technologies, inadequate technical know-how on the part of the teachers, intellectual laziness and plagiarism, and high cost of ICTs were the challenges found to impede ICT integration in education. Most schools especially those in the rural part of Ghana do not have computers and other relevant technologies. Moreover, teachers who leave in the cities are battling with a lack of internet connectivity and power supply. Again, most of the teachers lack the knowledge and skill in ICT. They do not know how to use ICT for delivering their lessons even if they have computers due to their poor

computing skills. Lastly, incorporating ICT in schools can be very expensive because of the high cost of the technologies (Soma et al., 2021).

2.5 Extent of use of ICT in teaching and learning among basic school teachers

A study conducted in the Volta Region of Ghana on exploring the usage of information communication technology tools and their benefits in basic schools in Ghana : a case of digital commons at the University of Nebraska - Lincoln technology tools and their benefits in basic schools in Ghana : a case of Agorpko found that basic school teachers do not use most of the ICT tools for teaching and learning (Banji, Okyere & Dogbe, 2020c). Another study reported ICT integration in teaching and learning to be low though some teachers use some of the infrastructure to demonstrate to the students (Sey, 2013).

2.6 Willingness of teachers towards the use of ICT in classroom

Teachers who teach science subjects were found to be more prepared in both the technical and pedagogical dimensions of readiness to implement digital curriculum. It was also discovered that teachers of intermediate level students are more technically and pedagogically prepared to implement digital curriculum than teachers of the other two levels (elementary and secondary). Secondary teachers demonstrated greater technical preparedness than elementary teachers. Elementary teachers, on the other hand, demonstrated higher levels of pedagogical readiness than secondary teachers (Al-Awidi & Aldhafeeri, 2017).

In South Africa, the majority of teachers were clearly optimistic about the use of ICT as tools for teaching and learning. Tablets were widely assumed to alter classroom interactions and reawaken dormant students. Teachers had a sense of control over the ICTs, which led them to believe that they could help students.

Furthermore, the teachers believed that ICTs provided an efficient approach to teaching and learning, and they were optimistic about receiving the necessary technical support from their colleagues and the larger community (Mwapwele et al., 2019).

According to a study on student-teachers' competence and attitude toward information and communication technology, Nigerian teachers, unlike teachers from other countries, have a positive attitude toward ICT integration in education. As a result, they are eager to incorporate ICT tools into the delivery of their lessons to students (Balogun, 2011). This contradicts a study on "Identifying Ghanaian pre-service teachers' readiness for computer use: A Technology Acceptance Model approach" by (Adu-Gyamfi, 2017). They discovered that pre-service teachers in Ghana find it difficult to use computers for teaching and learning purposes due to their previous education's pedagogical beliefs based on traditional methods of teaching and learning in schools.

However, in a study in Ghana on "Principals' ICT Proficiency Level and Tutors' Willingness to Adopt Modern Technological Devices in Teaching in the Volta and Greater Accra Regions, Ghana," tutors were willing to adopt ICT by willing to; use projectors in teaching, use Microsoft word, excel, and power point in teaching, use email in communicating with colleagues and students, use internet for accessing information in the classroom, use computer to perform assignments, use (N et al., 2019).

2.7 Factors associated with teacher's willingness towards ICT integration

According to a study titled "Contributing Factors to Pre-service Mathematics Teachers' e-readiness for ICT Integration," Technological Pedagogical Content

Knowledge is the most important factor in determining pre-service mathematics teachers' e-readiness, accounting for 42.1 percent of teachers' perceived readiness. Furthermore, teachers' perceptions of the effectiveness of ICT integration in mathematics instruction were found to contribute 11.3 percent to their perceived readiness to use ICT for instruction. It was also discovered that pre-service mathematics teachers' perceptions of ICT integration barriers influenced their perceived readiness to integrate ICT in mathematics instruction, accounting for 9.9 percent of the total variance in their perceived readiness (Apeanti, 2016).

In a review of literature by Buabeng-Andoh (2012) on factors influencing teachers' adoption and integration of information and communication technology into teaching, factors (barriers) that influence the use of ICT by teachers were categorized into teacher-level, school-level and system-level factors. Factors at the teacher level include lack of teacher ICT skills; lack of teacher confidence; lack of pedagogical teacher training; lack of follow-up of new and lack of differentiated training programmes. The school-level factors comprise absence of ICT infrastructure; old or poorly maintained hardware; lack of suitable educational software; limited access to ICT; limited project-related experience; lack of ICT mainstreaming into school's strategy and the system-level factors include rigid structure of traditional education systems; traditional assessment; restrictive curricula and restricted organizational structure. Knowing the extent to which these barriers affect individuals and institutions may help in taking a decision on how to tackle them.

Again, factors influencing teachers inability to integrate ICT in classroom were found to be less access to software although hardware is always provided, unavailability of in-service training courses on ICT integration, teacher's lack of

ICT proficiency and integration ideas not subject-specific (Esfijani & Zamani, 2020).

According to a study on “Factors influencing teachers' innovative teaching behaviour with information and communication technology (ICT): the mediating role of organizational innovation climate”, acceptance of technological innovation was found to have an indirect relationship with innovative teaching using ICT via the organizations' innovation climate. Furthermore, organizational innovation climate serves as a mediator, enhancing innovative teaching behaviour through the use of ICT. The acceptance of technological innovation by teachers is significantly and positively related to the innovation climate of organizations. This study discovered a link between group cohesion and the climate of organizational innovation. This implies that when teachers have more freedom and a more relaxed environment, they tend to better control their job progress and creativity; and when working on their tasks, teachers may be more creative, such as employing innovative teaching materials and approaches, using diverse instructional approaches, developing students' diverse intelligence and creativity, presenting free participation of creativity in course design, and implementing actual instruction (Chou, Shen, Hsiao & Shen, 2019).

Teachers' digital literacy was discovered to be a factor in propelling the successful implementation of ICT integration in teaching and learning in Ghana, and it cannot be overlooked. Training for digital literacy and the availability of technology in schools are insufficient to enable teachers to practice digital literacy with students and in their professional practice (Quaicoe & Pata, 2015).

2.8 Theoretical Framework: TAM

Technology Acceptance Model (TAM) was used as a framework for this study. The Technology Acceptance Model (TAM), developed by Davis (1989), serves as a valuable theoretical framework for understanding the willingness of basic school teachers to adopt Information Communication and Technology (ICT) tools for teaching in classrooms. TAM posits that an individual's intention to use technology is influenced by two primary factors: perceived ease of use and perceived usefulness. These factors are central to understanding the adoption of ICT tools by teachers in the context of basic education.

Perceived Ease of Use (PEOU)

Perceived ease of use refers to the degree to which an individual believes that using a particular technology will be free of effort (Davis, 1989). In the context of basic school teachers, PEOU represents the extent to which teachers perceive ICT tools as user-friendly and straightforward to incorporate into their teaching practices. Teachers who find ICT tools easy to use are more likely to express a willingness to adopt them in the classroom (Venkatesh, Morris, Davis, & Davis, 2003).

Perceived Usefulness (PU)

Perceived usefulness refers to the extent to which an individual believes that using a specific technology will enhance their job performance or effectiveness (Davis, 1989). In the context of basic school teachers, PU relates to how teachers perceive ICT tools as valuable tools for improving student learning outcomes and their own teaching practices. Teachers who see the potential benefits of using ICT tools are more inclined to adopt them in their classrooms (Venkatesh et al., 2003).

Behavioural Intention (BI)

According to TAM, an individual's intention to use technology is a direct precursor to their actual usage. In the context of basic school teachers, BI represents their intention to integrate ICT tools into their teaching practices. Teachers with a higher behavioural intention are more likely to make efforts to incorporate ICT tools into their classrooms (Davis, 1989).

Actual Technology Adoption

The adoption of ICT tools by basic school teachers is the final outcome of the TAM framework. It signifies the practical integration of technology into teaching practices based on teachers' perceptions of ease of use and usefulness and their behavioural intentions (Davis, 1989).

External Variables

TAM acknowledges that external variables, such as teacher characteristics, organizational support, and external pressures, can influence perceived ease of use, perceived usefulness, and behavioural intention (Venkatesh et al., 2003). For instance, professional development opportunities, access to resources, and support from school administrators can impact teachers' perceptions and intentions regarding ICT adoption.

In summary, the Technology Acceptance Model (TAM) provides a structured framework for understanding the willingness of basic school teachers to adopt ICT tools for teaching in classrooms. It emphasizes the crucial role of perceived ease of use, perceived usefulness, and behavioural intention in shaping teachers' adoption decisions. This framework allows for the examination of factors that promote or hinder ICT adoption, enabling educators, policymakers, and researchers to develop

targeted interventions and strategies to facilitate the integration of technology into basic education.

2.9 Conceptual framework

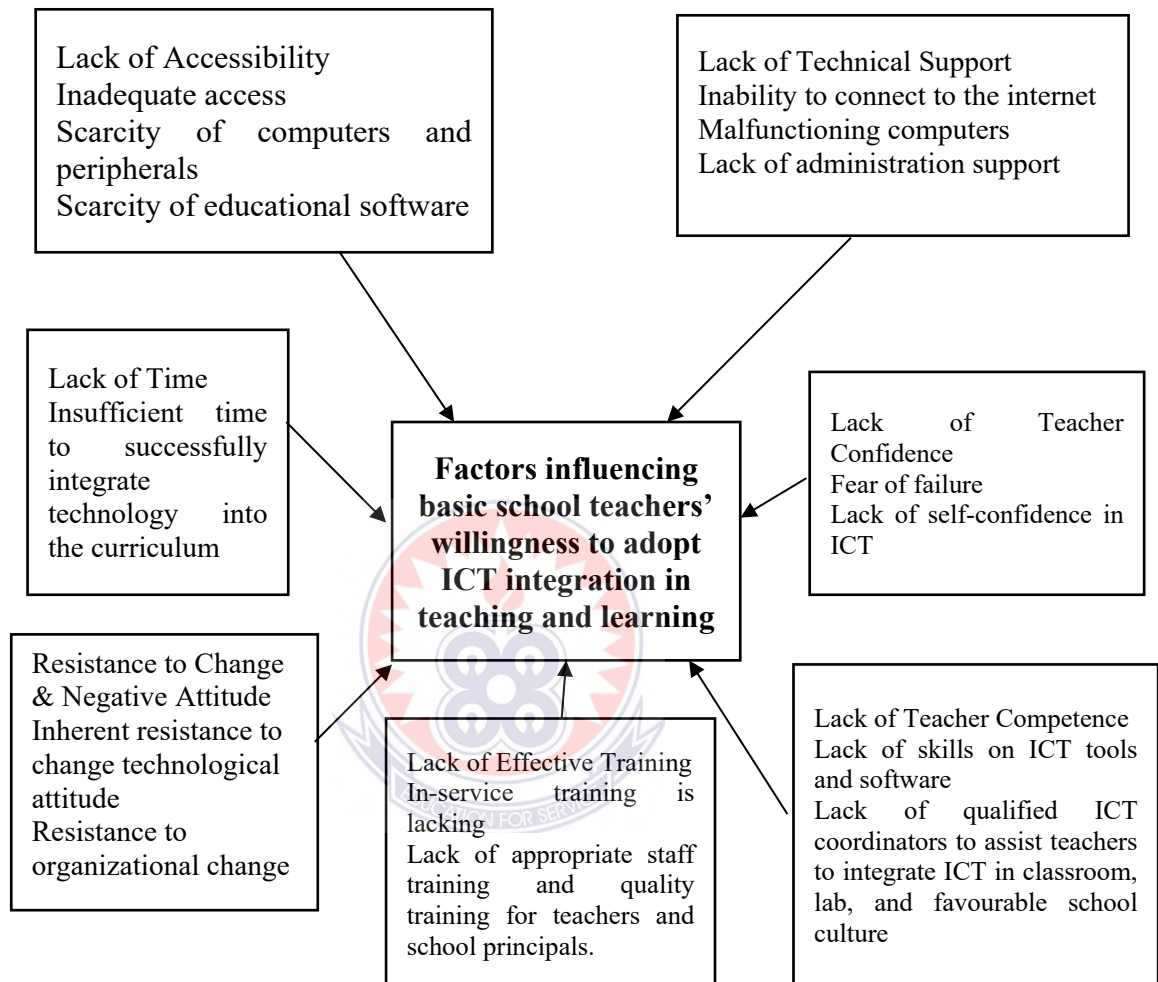


Figure 2. 2: Conceptual framework of the factors influencing basic school teachers' willingness to incorporate ICT in teaching and learning

Figure 1 is a conceptual framework depicting factors influencing basic school teachers' willingness to adopt ICT for teaching and learning in classrooms. The factors listed include lack of time, lack of effective training, resistance to changes and negative attitude, lack of technical support, lack of confidence, lack of competence and lack of accessibility.

2.10 Summary of literature review

In summary, this literature review focused on the following themes: definition of key terms, the availability of ICT infrastructure for teaching and learning, the challenges of using ICT for teaching and learning, teachers' attitudes toward the use of ICT, and factors influencing teachers' attitudes toward ICT integration at the basic school level. In terms of infrastructure availability, it was revealed that the adoption and integration of ICT in teaching and learning have been hampered by a lack of ICT infrastructure. In developed countries, the average access to ICT infrastructure is one computer for every 15 students, but in Africa, the average computer student ratio at the college level is 1:45. This low infrastructure ratio however, inhibits the acquisition of skills in the use of ICT for teaching and learning. Teachers' beliefs, school culture, outdated curricula, and traditional teaching methods were identified as barriers to the effective use of ICT in education. On attitude of teachers towards ICT integration, it was discovered that pre-service teachers in Ghana find it difficult to use computers for teaching and learning purposes due to their previous education's pedagogical beliefs based on traditional methods of teaching and learning in schools. The review also focused on the factors influencing teachers' willingness to adopt ICT in classrooms. Some of the factors influencing teachers' inability to integrate ICT in classroom were found to be less access to software although hardware is always provided, unavailability of in-service training courses on ICT integration, teacher's lack of ICT proficiency and integration ideas not subject-specific.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods that were used in data collection, analysis, and interpretation. The chapter discusses the research design, the study area information, the study population and sample size, sampling technique and procedures, and the sampling technique and procedures. It also discusses the data collection instruments, the pilot study, the validity and reliability of the research instruments, data analysis procedures, and ethical and legal issues.

3.2 Research Design

A quantitative research approach was used to guide this study. A quantitative approach was chosen to provide objective and quantifiable measurements of teachers' willingness to adopt ICT tools, which are essential for assessing the extent of adoption (Davis, 1989). It provides findings that can be generalized to a larger population of basic school teachers, allowing for broader implications. It also allows for efficient data collection from a large sample of basic school teachers, enabling a broader understanding of the willingness to adopt ICT tools (Creswell & Creswell, 2017). Quantitative approaches offer the advantage of assessing the validity and reliability of research instruments, ensuring that the data collected are accurate and consistent (Bryman, 2016).

A descriptive cross-sectional study design was used for the study. A descriptive cross-sectional study design was employed to provide a snapshot of the current status of basic school teachers' willingness to adopt ICT tools. This design captures

data at a single point in time, allowing for an assessment of the prevailing attitudes and behaviours. Findings from a cross-sectional study can inform policy recommendations and immediate interventions based on the current needs and preferences of basic school teachers, contributing to more targeted and timely actions. (Creswell & Creswell, 2017).

3.3 Research Site Description

The research was carried out in the Ashaiman municipality, Greater-Accra Region, Ghana. Ashaiman Municipal District is one of the twenty-nine districts in Ghana's Greater Accra Region. It was previously part of the then-larger Tema Municipal District, which was formed from the former Tema District Council, until two parts of the district were later split off to create Adenta Municipal District (from the northwest part) and Ashaiman Municipal District (from the north central part) respectively on 29 February 2008; thus, the remaining part was elevated to metropolitan district assembly status on that same year to become Tema Metropolitan District. The municipality is located in the central part of the Greater Accra Region, with Ashaiman as its capital city. The district is bounded to the north by Kpone Katamanso District and to the south by Tema Metropolis District. The district spans 45 square kilometres. Ashaiman's main economic activities are retail and scrap. According to Ghana Statistical Service data, the current population is 235,465.

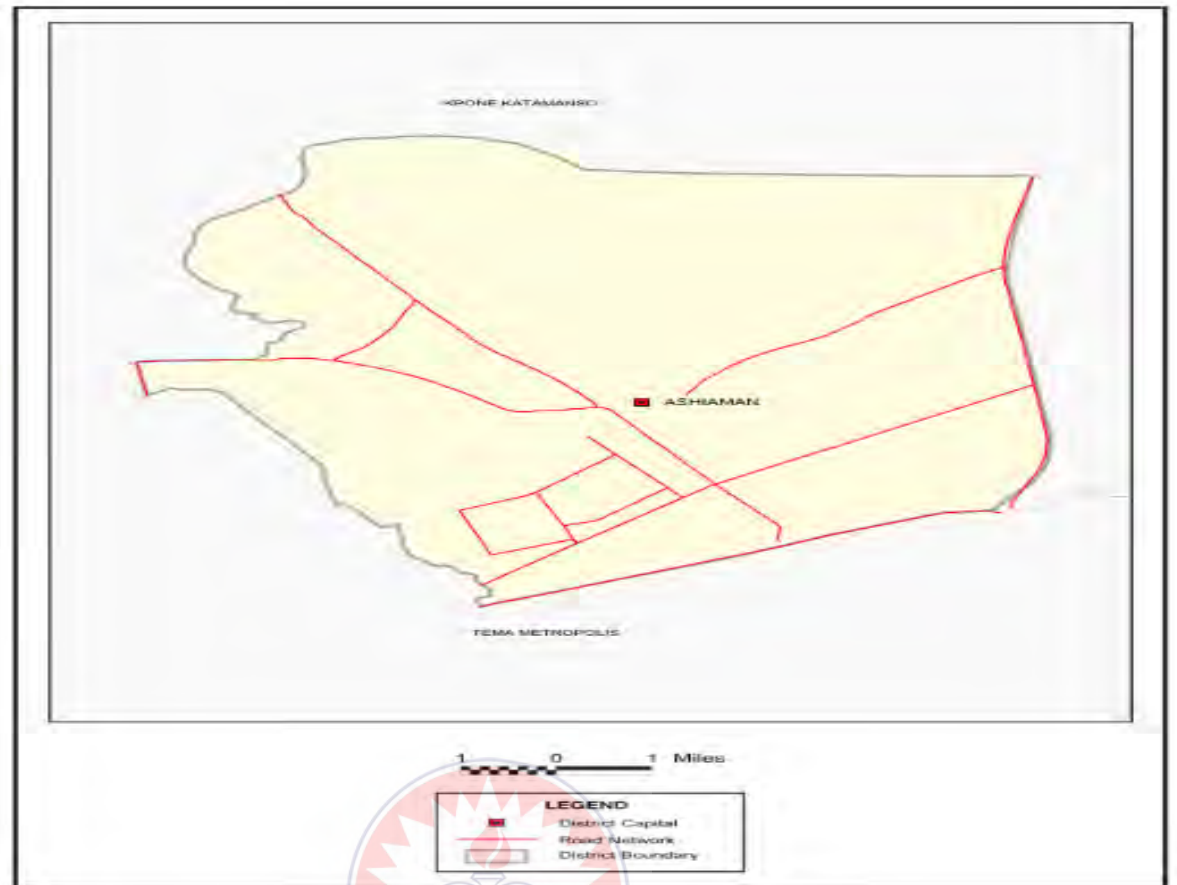


Figure 3. 2: District map of the Ashaiman Municipality

Source: Ghana Statistical Service (2014)

3.4 Target Population

All elements, individuals, or objects with similar observable characteristics are referred to as a population (Creswell & Creswell, 2017). According to the Ghana Statistical Service [GSS] (2018), Ashaiman has 194 primary schools, 180 of which are private and 14 of which are public. All primary school teachers in the municipality were included in this study. Teachers were targeted because they are the primary implementers of the classroom ICT integration program.

3.5 Sample and Sampling Techniques

A sample is a portion of the population (Babbie, 2014). According to Gay, Mills, and Airasian (2009), a sample size of 10% to 30% of the population is required for sufficient and reliable results. 58 primary schools were chosen, accounting for 30% of all primary schools, and 348 teachers were interviewed.

In order to select the schools for the study, a simple random sampling technique was used. The use of simple random sampling ensured that every basic school teacher in the population had an equal chance of being included in the sample. This approach enhances the representativeness of the sample, reducing the risk of selection bias (Babbie, 2016). Simple random sampling also has ethical advantages, as it reduces the potential for favouritism or discrimination in participant selection. It treats all potential participants equally, upholding ethical research practices (Creswell & Creswell, 2017)

A list of all primary schools was written on pieces of paper, folded and placed in a basket. A neutral person either than the principal investigator was made to pick a piece of paper one at a time without replacement until the number of schools required was reached. Six teachers were conveniently interviewed from each of the selected schools after consenting.

3.6 Data Collection Tool and procedure

3.6.1 Data collection tool

The questionnaire was sectioned into four, A, B, C and D. Section A was used to gather the teacher's demographic information, section B gathered information on availability of ICT facilities, section C gathered information on the level of ICT

integration in teaching and learning, and section D gathered information on teachers' ICT literacy level. This approach of a questionnaire was used because enables the collection of data relevant to the research objectives.

3.6.2 Data Collection Procedures

The researcher secured a letter of introduction from the University of Education, Winneba. The introduction letter enabled the researcher to secure research permit from the University of Education's Ethics Review Board. The acquired permit was presented to the Ashaiman Education Officer for issuance of a clearance letter for data collection from the sampled schools. The researcher visited the sampled schools and after presenting the official permission letters to principals and striking rapport, data collection commenced. The researcher personally administered the questionnaire to the teachers. Before each interview, respondents were requested to verbally consent before the commencement of data collection.

This style of data collection was done to ensure that participants willingly participate in the study, protecting their rights and privacy, maintenance of the integrity of the study and compliance with institutional and ethical guidelines. The researcher personally administered the questionnaire to allow for standardized data collection, reduce potential variations in data collection that may arise from different interviewers. This enhances the reliability of the study (Creswell & Creswell, 2017).

3.7 Data Processing and Analysis

The data was cleaned by editing to identify omissions and errors. After coding, the data from questionnaire was fed into the STATA 17.0 software for analysis. The data collected was analysed with respect of the study objectives using descriptive techniques. Descriptive statistics such as frequencies, proportions and percentages

were performed on categorical variables while means and standard deviations were used on quantitative variables. The findings and the results were presented in tables and charts.

A median score was calculated for ICT integration level and ICT literacy, anyone that scores below the median was classified as having an unfavourable integration level, and ICT literacy rate while those who scored above or equal to the median were considered as having a favourable integration level and ICT literacy rate.

3.8 Ethical Considerations

To ensure observation of legal measures, the researcher secured a letter of introduction from the University of Education, Winneba. The introduction letter enabled the researcher secure research permit from the University of Education's Ethics Review Board. The acquired permit was presented to the Ashaiman Education Officer for issuance of a clearance letter for data collection from the sampled schools. A prior visit to the sampled schools was made and after striking rapport with both teachers and head teachers, data collection commenced. To ensure ethical considerations, the respondents were assured of anonymity and utmost confidentiality. A verbal consent was sought from the respondents before data collection proceeded. Respondents were assured of the right to withdraw from the data collection process at any stage without any consequences. To observe copy rights and avoid plagiarism, the researcher acknowledged all the sources of information collected from reviewed journals articles, textbooks, unpublished and published theses as well as other research materials.

CHAPTER FOUR

RESULTS

4.1 Introduction

Analyses of data collected from the respondents are presented in this chapter. The chapter first looked at the demographic characteristics of the respondents. It then proceeded to focus on the availability of ICT facilities. Again, the chapter interpreted data on the level of ICT integration in teaching and learning. It also focused on the ICT literacy rate of the respondents. Finally, the chapter provided an interpretation of the challenges teachers face while integrating ICT into teaching and learning.

4.2 Demographic characteristic of the respondents

The demographic characteristics of the study respondents are presented in Table 1. A total of 348 primary school teachers were interviewed for this study. Out of the total number, the majority (156, 46.7%) of the them were aged between 25-29 years with a mean age of 28.5 ± 4.4 years. 219 (62.9%) were predominantly males and 192 (55.2%) of the study participants attained a diploma. Most of the teachers' computer skills were moderate.

Table 4. 10: Demographic characteristics of respondents

Variables	Frequency (n=348)	Percentages (%)
Age groups [Mean±S.D.]	[28.5±4.4]	
<25	52	15.6
25-29	156	46.7
30-35	106	31.7
36-39	9	2.7
40+	11	3.3
Sex		
Female	129	37.1
Male	219	62.9
Highest educational level		
Certificate	82	23.7
Diploma	192	55.2
Bachelor's degree	63	18.1
Postgraduate degree	11	3.2
Computer skills rate		
Beginner	38	10.9
Moderate	279	80.2
competent	31	8.9

4.3 Availability of ICT facilities

Table 2 shows the ICT facilities available in the respondents' schools. Desktop computers were moderately available in most (251, 72.1%) of the respondents' schools and 252 (72.4%) said interactive white boards were moderately available. About 66 (19.0%) of the schools lack a source of electric power. When asked if their schools had a WIFI, 300 (86.2%) of the teachers said WIFI was not available, 30 (8.6%) said it was moderately available while 18 (5.2%) said their school had a WIFI.



Table 4. 11: Availability of ICT facilities

ICT Facility/Resource (n=348)	NA n (%)	MA n (%)	SA n (%)
Desk top Computers for teachers & pupils use	30 (8.6%)	251 (72.1)	67 (19.3%)
Interactive white boards	23 (6.6%)	252 (72.4%)	73 (21.0%)
Overhead projectors	162 (46.6%)	108 (31.0%)	78 (22.4%)
Internet connection	64 (18.4%)	231 (66.4%)	53 (15.2%)
Laptops for teachers	225 (64.7%)	110 (31.6%)	13 (3.7%)
Source of electric power	66 (19.0%)	192 (55.2%)	90 (25.9%)
Tablets for pupils	266 (76.4%)	70 (20.1%)	12 (3.5%)
VCD/DVD Player	284 (81.6%)	57 (16.4%)	7 (2.0%)
Video recorder/player	275 (79.0%)	64 (18.4%)	9 (2.6%)
Copy scanner	263 (75.6%)	80 (23.0%)	5 (1.4%)
Photocopy Machine	129 (37.1%)	192 (55.2%)	27 (7.8%)
Television	209 (60.1%)	78 (22.4%)	61 (17.5%)
Radio	104 (29.9%)	147 (42.2%)	97 (27.9%)
Digital Camera	278 (79.9%)	63 (18.1%)	7 (2.0%)
WIFI	300 (86.2%)	30 (8.6%)	18 (5.2%)
Fax machine	300 (86.2%)	41 (11.8%)	7 (2.0%)

NA: Not available, MA: Moderately available, SA: Sufficiently available

4.4 Level of ICT Integration in Teaching and Learning

Table 3 shows the level of ICT integration in teaching and learning by the respondents. In general, 48% of the basic school teachers use ICT facilities in teaching and learning in classrooms while 52% do not (Figure 1). 250 (71.8%) responded agree to using ICT to prepare lesson and reports. 120 (34.5%) use ICT for monitoring and evaluation of the children's progress and performance. 151 (43.4%) said using computers is difficult and 147 (42.2%) said using computers makes them feel isolated from others.



Table 4. 12: Level of ICT Integration in Teaching and Learning

Statement	SD	D	A	SA
I use ICT in teaching and learning (n=348)	N (%)	N (%)	N (%)	N (%)
to prepare lesson and reports	17 (4.9%)	33 (9.5%)	250 (71.8%)	48 (13.8%)
internet to search teaching material	8 (2.3%)	21 (6.0%)	266 (76.4%)	53 (15.2%)
to communicate with students and parents	75 (21.6%)	117 (33.6%)	139 (39.9%)	17 (4.9%)
especially computer and its applications	105 (30.2%)	84 (24.1%)	145 (41.7%)	14 (4.0%)
to monitor and evaluate children progress or performance	116 (33.3%)	102 (29.3%)	120 (34.5%)	10 (2.9%)
to make presentation slides/delivery	123 (35.3%)	99 (28.5%)	120 (34.5%)	6 (1.7%)
to provide and prepare online work or assignment	47 (13.5%)	32 (9.2%)	231 (66.4%)	38 (10.9%)
I make use of the vast teaching aids from internet such as charts and pictures to enhance teaching in especially science and other	125 (35.9%)	84 (24.1%)	131 (37.6%)	8 (2.3%)

subjects

I sometimes teach using audio visual aids such as videos	45 (12.9%)	111 (31.9%)	107 (30.8%)	85 (24.4%)
I use internet material to supplement what they get from text books	127 (36.5%)	98 (28.2%)	114 (32.8%)	9 (2.6%)
I invest in a personal computer/laptop	26 (7.5%)	19 (5.5%)	242 (69.5%)	61 (17.5%)
I encourage my learners to source information from internet	38 (10.9%)	15 (4.3%)	229 (65.8%)	66 (19.0%)
I avoid using computers whenever I can	81 (23.3%)	106 (30.5%)	108 (31.0%)	53 (15.2%)
Working with computers makes me feel isolated from other people	147 (42.2%)	113 (32.5%)	86 (24.7%)	2 (0.6%)
Computers are difficult to use	151 (43.4%)	121 (34.8%)	75 (21.6%)	1 (0.3%)
I store my information in a computer more than in files	123 (35.3%)	120 (34.5%)	89 (25.6%)	16 (4.6%)

SD: Strongly disagree, D: Disagree, A: Agree, SA: Strongly agree

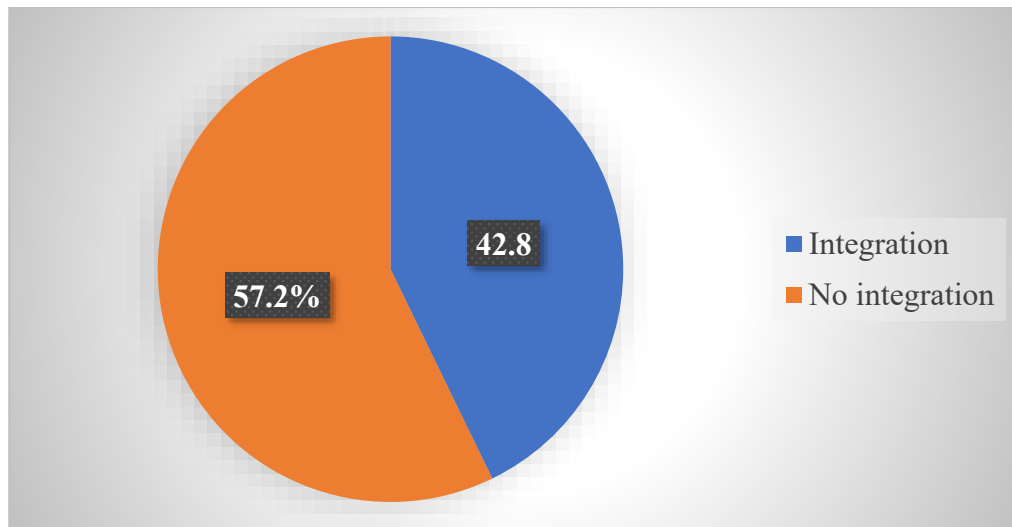


Figure 4. 3: Overall level of ICT integration in teaching and learning

4.5 Teacher's ICT Literacy

ICT literacy was assessed based on the following themes; general skills, file management skills, word processing skills, printing skills and online communication, navigation and browser skills. However, with regards to the overarching literacy rate, 49.1% were ICT literate while 58.9% were ICT illiterates (Figure 2).

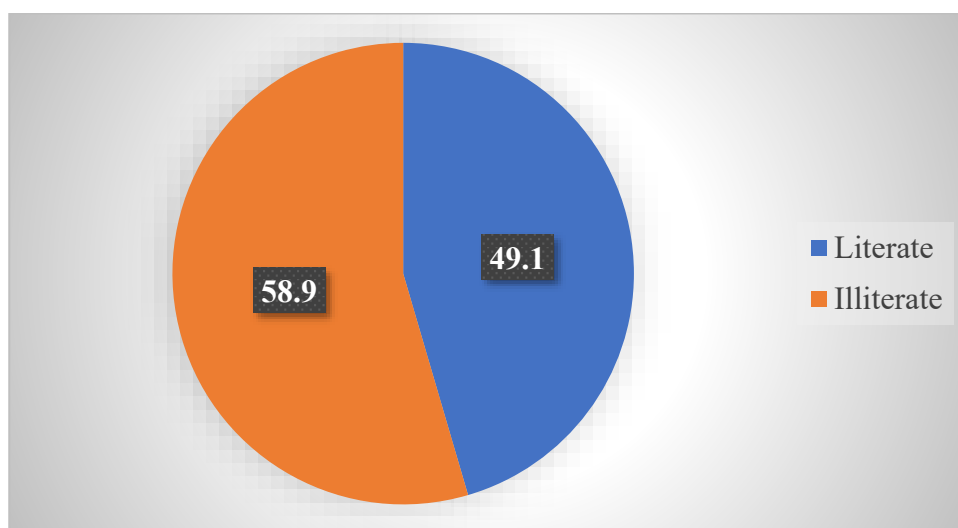


Figure 4. 4: Overall ICT literacy rate

4.5.1 General Skills

208 (59.8%) of the basic school teachers are above average in terms of being familiar with basic computer systems parts and concepts. 39 (11.2%) were masters in shutting the computer down appropriately. 234 (67.3%) could install and uninstall a programme. 207 (59.5%) understand file extensions and differences between file types. 62 (17.8%) cannot use the mouse right-click menu functions (Table 4).

Table 4. 13: General Skills

Variables (n=348)	None n (%)	Average n (%)	Above Average n (%)	Master n (%)
Familiar with basic computer system parts and concepts (e.g., motherboard, central processing unit (CPU), hard drive, random access memory-RAM, etc.)	10 (2.9%)	104 (29.9%)	208 (59.8%)	26 (7.5%)
Able to use Help menus to find answers to my questions	9 (2.6%)	103 (29.6%)	220 (63.2%)	16 (4.6%)
Understand file extensions and differences between file types (e.g. .doc, .gif, .html, .ppt. etc.)	35 (10.1%)	89 (25.6%)	207 (59.5%)	17 (4.9%)
Able to shut down a computer appropriately	42 (12.1%)	64 (18.4%)	203 (58.3%)	39 (11.2%)
Able to perform a safe reboot of the operating system with keystrokes	56 (16.1%)	66 (19.0%)	192 (55.2%)	34 (9.8%)

Understand the difference between closing/minimizing/hiding windows and quitting a program	62 (17.8%)	61 (17.5%)	192 (55.2%)	33 (9.5%)
Able to use the mouse right-click menu functions	62 (17.8%)	63 (18.1%)	188 (54.0%)	35 (10.1%)
Able to install and uninstall a programme	57 (16.4%)	57 (16.4%)	194 (55.8%)	40 (11.5%)

4.5.2 File Management Skills

207 (59.5%) of the respondents said their ability to navigate through files and directories was above average while 32 (9.2%) said they were masters in organizing, copying and pasting files in directories (Table 5).

Table 4. 14: File Management Skills

Variables (n=348)	None n (%)	Average n (%)	Above Average n (%)	Master n (%)
Able to navigate through files and directories (e.g., using Windows Explorer)	53 (15.2%)	68 (19.5%)	207 (59.5%)	20 (5.8%)
Able to organize, copy and paste files in directories	58 (16.7%)	57 (16.4%)	201 (57.8%)	32 (9.2%)
Able to move unwanted files into my recycle bin and delete them permanently from my hard drive	68 (19.5%)	57 (16.4%)	196 (56.3%)	27 (7.8%)

4.5.3 Word Processing Skills

Table 4.6 shows the word processing skills of the study participants. 210 (60.3%) said their ability to edit, copy, cut and paste a block of text or selected objects was above average. Ability to save, print and preview documents was reported to be above average among 186 (53.5%) of the respondents. The ability to name and insert pages for tables and figures in a document was reported to be above average among 181 (52%) of the respondents and 8 (2.3%) were masters in putting several files into zip.

Table 4. 15: Word Processing Skills

Variables (n=348)	None n (%)	Average n (%)	Above Average n (%)	Master n (%)
Able to edit, copy, cut and paste a block of text or selected objects	51 (14.7%)	54 (15.5%)	210 (60.3%)	33 (9.5%)
Able to use undo/redo functions	65 (18.7%)	48 (13.8%)	195 (56.0%)	40 (11.5%)
Able to save, print and preview documents	66 (19.0%)	57 (16.4%)	186 (53.5%)	39 (11.2%)
Able to select and change fonts sizes and types, styles (e.g., boldface, italics, underlining, etc.)	76 (21.8%)	53 (15.2%)	180 (51.7%)	39 (11.2%)
Able to create itemized lists (e.g., bullets, numbered lists)	73 (21.0%)	51 (14.7%)	196 (56.3%)	28 (8.1%)
Able to insert pages to a formal report with preliminaries and the main body	72 (20.7%)	58 (16.7%)	193 (55.5%)	25 (7.2%)

Able to name and insert pages for tables and figures in a document	80 (23.0%)	59 (17.0%)	181 (52.0%)	28 (8.1%)
Able to insert automatic table of contents	82 (23.6%)	59 (17.0%)	186 (53.5%)	21 (6.0%)
Able to review a word document online	92 (26.4%)	58 (17.0%)	173 (49.7%)	25 (7.2%)
Able to use picture tools formatting commands such as cropping and wrap text	85 (24.4%)	60 (17.2%)	180 (51.7%)	23 (6.6%)
Able to use Equation editor	83 (23.9%)	92 (26.4%)	156 (44.8%)	17 (4.9%)
Able to insert symbols	98 (28.2%)	60 (17.2%)	174 (50.0%)	16 (4.6%)
Able to insert charts using excel	83 (23.9%)	91 (26.2%)	160 (46.0%)	14 (4.0%)
Able to lock a document with a password	81 (23.3%)	90 (25.9%)	163 (46.8%)	14 (4.0%)
Able to share information through Google drive sheets	85 (24.4%)	71 (20.4%)	178 (51.2%)	14 (4.0%)
Able to put several files in a zip	93 (26.7%)	101 (29.0%)	146 (42.0%)	8 (2.3%)

4.5.4 Printing Skills

With regards to the printing skills, 60 (17.2%) cannot change printer parameters like page numbers, paper orientation, margins and proportions, etc. 45 (12.9%) are masters in changing printing options from grayscale, normal, fast-draft or best (Table 7).

Table 4. 16: Printing Skills

Variables (n=348)	None n (%)	Average n (%)	Above Average n (%)	Master n (%)
Able to change printer parameters like page numbers, paper orientation, margins and proportions, etc.	60 (17.2%)	62 (17.8%)	180 (51.7%)	46 (13.2%)
Able to change printing options from grayscale, normal, fast-draft or best	63 (18.1%)	66 (19.0%)	174 (50.0%)	45 (12.9%)

4.5.5 Online Communication, Browser and Navigation Skills

67 (19.3%) can averagely use the basic browser commands to surf the internet. 173 (49.7%) said their ability to compose, send, receive, reply to and forward email messages was above average. 17 (4.9%) said they were master in understanding that some copyright restrictions apply to computer software and Internet documents (Table 8).

Table 4. 17: Online Communication, Browser and Navigation Skills

Variables (n=348)	None n (%)	Average n (%)	Above Average n (%)	Master n (%)
I am able to use the browser basic commands to surf the Internet	64 (18.4%)	67 (19.3%)	187 (53.7%)	30 (8.6%)
I am able to request, activate my ODU email account	84 (24.1%)	53 (15.2%)	185 (53.2%)	26 (7.5%)
I am able to compose, send, receive, reply to and forward email messages	92 (26.4%)	59 (17.0%)	173 (49.7%)	24 (6.9%)
I am able to attach/detach documents to/from email messages	91 (26.2%)	63 (18.1%)	169 (48.6%)	25 (7.2%)
I am able to use search engines to locate desired information	81 (23.3%)	59 (17.0%)	188 (54.0%)	20 (5.8%)
I am able to understand the difference between Search Engines (e.g., Google) and Directories (e.g., Yahoo)	84 (24.1%)	57 (16.4%)	187 (53.7%)	20 (5.8%)
I am able to understand that some copyright restrictions apply to computer software and Internet documents	93 (26.7%)	59 (17.0%)	179 (51.4%)	17 (4.9%)
I am able to understand how I can use gathered information from the Internet without violating copyright laws	96 (27.6%)	64 (18.4%)	169 (48.6%)	19 (5.5%)
I am able to demonstrate an understanding of what constitutes plagiarism	89 (25.6%)	101 (29.0%)	148 (42.5%)	10 (2.9%)
I am able to know basic steps to ensure my online privacy and computer security	26 (7.5%)	224 (64.4%)	88 (25.3%)	10 (2.9%)

4.5 Challenges faced by teachers while integrating ICT in teaching and learning

One of the objectives of this study was to determine the challenges teachers face while integrating ICT in teaching and learning. The majority (42.8%) said the challenges they face is low internet connectivity. 240 (69.0%) of the study participants said maintenance issues have rendered the computers in their schools not accessible to the teachers as well as students. 63 (18.1%) mentioned unstable electricity as a challenge while 21 (6.0%) said they had not received any training on ICT.

Table 4. 18: Challenges faced by teachers while integrating ICT in teaching and learning

Variables (n=348)	Frequency (n)	Percentage (%)
Low internet connectivity	149	42.8
Poor funding	146	42.0
Lack of time	118	33.9
Hardware maintenance issues	240	69.0%
Unstable electricity	63	18.1
Lack of ICT training	21	6.0
Software unavailable	46	13.2
Others	50	14.4

Others: No conducive room for lesson, Low literacy rate

4.6 Limitations

This study has some limitations. First of all, this is a cross-sectional study hence the results cannot be generalized to the entire population of basic school teachers in Ghana. Also, ICT competency and integration were self-reported by the respondents so information bias might. Although, the researcher is confident in the results since respondents' consent was sought before commencement of data collection. The respondents were also assured of confidentiality.



CHAPTER FIVE

DISCUSSION, SUMMARY OF FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS

5.1 Introduction

This chapter deals with discussion, summary of findings, conclusions and recommendations. It also suggests areas for further research on the study.

5.2 Discussion

5.2.1 Availability of ICT facilities in basic schools for teaching and learning.

The first objective was to assess the availability of ICT facilities in basic schools for teaching and learning. In the present study, most of the basic schools have the ICT facilities in moderate numbers. Computers, interactive whiteboards, internet connection, power supply, photocopier machine and radio were available moderately on the basic schools. However, this finding differs from another study conducted in Adansi Atobiase which found that ICT facilities were not available in basic schools (Ampofo & Abrefi, 2020). Also, a study in Cape Coast North found that ICT facilities were not available in basic schools (Broni, 2017). The differences between these studies and the present study can be attributed to the study location. The present study was conducted in an urban area whilst the other studies were in rural areas and mostly rural areas sometimes lack some necessary resources due to their geographic positioning.

This finding implies that the moderate availability of computers and interactive whiteboards suggests that basic schools in Ashaiman have some access to essential

ICT tools. This access can provide opportunities for teachers and students to engage with digital resources, multimedia content, and interactive learning materials. Also, the presence of an internet connection, even at a moderate level, can be significant. It allows teachers and students to access online educational resources, conduct research, and engage in web-based learning activities. However, the quality and reliability of the internet connection should also be considered, as these factors can impact effective use. The availability of power supply is crucial for the functionality of ICT equipment. A stable power supply ensures that computers and other electronic devices can be used consistently. In areas with unreliable power, schools may need to invest in backup power sources, such as generators or solar power, to maintain ICT functionality. Photocopy machines are valuable for distributing printed materials and worksheets to students. They can also support the creation of teaching resources. However, the extent to which photocopy machines are utilized and their condition (e.g., maintenance and availability of supplies) should be considered. Radio can serve as a useful educational tool, especially in areas with limited access to other ICT resources. Educational radio programs can supplement classroom instruction and provide students with additional learning opportunities, particularly in subjects like science, mathematics, and languages.

5.2.2 The extent of using ICT in teaching and learning among basic school teachers

The integration of ICT in teaching and learning was low because most of the basic school teachers do not use ICT tools in teaching learning. However, most of the respondents use ICT to prepare lesson and reports while others use ICT for monitoring and evaluation of the children's progress and performance. The finding is consistent with that of a study conducted in the Volta Region of Ghana which

found that basic school teachers do not use most of the ICT tools for teaching and learning (Banji, Okyere & Dogbe, 2020). Another study reported ICT integration in teaching and learning to be low though some teachers use some of the infrastructure to demonstrate to the students (Sey, 2013). The consistency among these studies can be attributed to the geographical location of the study participants.

The finding has its implications. The low ICT integration implies that students in basic schools in Ashaiman may have limited exposure to digital learning opportunities. They may miss out on the benefits of interactive multimedia content, online resources, and technology-enhanced pedagogical methods. It also suggests that traditional teaching methods may prevail, potentially limiting the variety of instructional approaches available to teachers. This could impact engagement, motivation, and the ability to address diverse learning styles. ICT can enhance the quality of education by making learning more engaging, interactive, and tailored to individual needs. Low integration may mean that students are missing out on these benefits, potentially affecting their academic performance and readiness for the digital age. In an increasingly digital and globalized world, students need digital literacy and ICT skills to compete and succeed. Low ICT integration may leave students less prepared for the demands of the 21st century workforce.

5.2.3 To identify the challenges in using ICT in teaching and learning in the classroom

In the present study, challenges hindering the integration of ICT in teaching and learning included low internet connectivity, poor funding, maintenance issues, and unstable electricity as shown in Table 9. This result is in agreement with a study conducted in Ajumako. The study found that limited technology infrastructure

(especially internet access, limited hardware and software provision, lack of technical support for computer usage, general inadequacy of learning resources, course curricula and other learning materials that incorporate ICT use and high cost of ICT equipment and materials are the challenges teachers face in incorporating ICT into teaching and learning at basic schools in Ajumako (Ampofo, Abigail & Yao, 2020).

The findings were also consistent with a study by Soma et al. (2021) which found, unavailability of computer and its related technologies, inadequate technical know-how on the part of the teachers, intellectual laziness and plagiarism, and high cost of ICTs to be the challenges impeding ICT integration in education. They further explained that most teachers who live in the cities battle with a lack of internet connectivity and power supply. Again, most of the teachers lack the knowledge and skill in ICT. They do not know how to use ICT for delivering their lessons even if they have computers due to their poor computing skills. Lastly, incorporating ICT in schools can be very expensive because of the high cost of the technologies.

This finding also has its implication. Limited access to the internet can hinder teachers' ability to access online educational resources, conduct research, and utilize web-based learning platforms. It restricts students' exposure to a wealth of digital content and collaborative online learning opportunities. Again, insufficient funding can result in schools lacking the necessary ICT equipment, software, and maintenance resources. It limits the capacity to provide ongoing training for teachers and upgrade outdated technology. Poorly maintained ICT equipment can lead to frequent breakdowns and disruptions in teaching and learning activities. Teachers may be discouraged from using technology if they anticipate ongoing technical issues. Frequent power outages or fluctuations can disrupt ICT usage in the

classroom, causing frustration and hindering the effectiveness of digital teaching and learning.

In order to address these challenges, these strategies can be adopted.

1. Investment in improving and expanding internet infrastructure, such as broadband access, in schools and surrounding areas.
2. Utilizing offline digital resources and encouraging teachers to download and use educational materials when internet connectivity is limited.
3. Advocating for increased budget allocations to support ICT integration in education.
4. Exploring public-private partnerships or seeking grants and donations to supplement funding for ICT initiatives.
5. Implementing regular maintenance schedules and protocols for ICT equipment.
6. Training school staff or hiring dedicated IT personnel to handle maintenance tasks.
7. Investing in alternative power sources, such as generators or solar panels, to provide a stable electricity supply.
8. Implementing energy-efficient technologies and practices to reduce power consumption.

5.3 Summary of findings

This study sought to assess willingness of basic school teachers to adopt ICT tools in teaching and learning in Ashaiman Municipality, Greater-Accra, Ghana. 348 questionnaires were administered to basic school teachers. Data collected was analysed using descriptive statistics. The major findings are summarized as follows:

1. A descriptive analysis of the availability of ICT infrastructure showed that most of the basic schools have the ICT facilities in moderate numbers. Computers, interactive whiteboards, internet connection, power supply, photocopier machine and radio were available moderately on the basic schools.
2. On the extent of integration of ICT tools in teaching and learning, most of the basic school teachers do not use ICT tools in teaching and learning although, the majority of them use ICT to prepare lesson and reports and others use it for monitoring and evaluation of the pupil's progress and performance.
3. Challenges hindering the integration of ICT in teaching and learning were low internet connectivity, poor funding, maintenance issues, unstable electricity among others.

5.4 Conclusion

The findings of this study shed light on the current state of Information Communication and Technology (ICT) infrastructure, ICT integration in teaching and learning, and the challenges faced by basic school teachers in Ashaiman. It is evident that while there is a moderate level of availability of ICT tools and resources in basic schools, the integration of ICT into teaching and learning remains low. Furthermore, several significant challenges, including low internet connectivity, poor funding, maintenance issues, and unstable electricity, act as barriers to effective ICT adoption.

The moderate availability of ICT tools, including computers, interactive whiteboards, and internet connectivity, presents a foundation upon which to build

digital learning opportunities. However, the low integration of ICT into teaching and learning represents a missed opportunity to harness the full potential of technology in education.

5.5 Recommendations

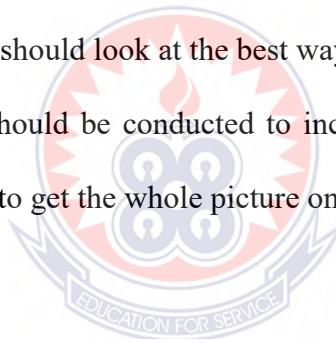
Based on the findings of this study, these recommendations should be considered.

1. **Infrastructure Enhancement:** The educational authorities and relevant stakeholders should prioritize the improvement of ICT infrastructure in basic schools. This includes upgrading internet connectivity, ensuring stable power supply, and maintaining ICT equipment to minimize disruptions.
2. **Budget Allocation:** Advocacy for increased funding for ICT initiatives in basic schools is essential. Adequate budget allocation will enable schools to invest in essential technology and provide training for teachers.
3. **Teacher Training:** Develop and implement comprehensive teacher training programs focused on ICT integration in pedagogy. Teachers should be equipped with the skills and knowledge to effectively incorporate technology into their teaching methods.
4. **Curriculum Alignment:** Review and adapt the curriculum to align with ICT integration goals. Ensure that ICT is integrated into subject areas and learning outcomes to promote a seamless fusion of technology and education.
5. **Alternative Power Sources:** Given the challenge of unstable electricity, consider implementing alternative power sources, such as solar panels or generators, to ensure uninterrupted access to ICT resources.

6. **Community Engagement:** Raise awareness among parents, communities, and local authorities about the importance of ICT in education. Encourage community support and involvement in addressing ICT challenges.
7. **Collaboration:** Foster collaboration among educational institutions, government agencies, and private sector partners to leverage resources, expertise, and technology support.
8. **Regular Assessment:** Continuously monitor and evaluate the impact of ICT integration efforts. Gather feedback from teachers and students to inform adjustments and improvements in ICT initiatives.

5.6 Recommendations for further research

1. Further research should look at the best ways the challenges can be checked
2. More research should be conducted to include basic school teachers in the country in order to get the whole picture on ICT integration.



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APPENDIX A

QUESTIONNAIRE

You are expected to respond to all questions by ticking (✓)

SECTION A: Demographic Information

1. Gender: Male Female
2. Age bracket: Below 30 years 31 – 40 41 – 50 Above 50
3. Highest level of education in teaching Profession attained: P1 Certificate
Diploma Bachelor's Degree Post graduate Degree
4. How would you rate your use of computer skills level? Beginner Moderate
Competent

SECTION B: Availability of ICT Facilities

5. Please indicate the level of availability of the following ICT facilities in your school

using the following scale:

NA= Not Available (1)-Completely none existent

MA = Moderately Available (3)-Available in quantities that can create an impact, though not sufficiently adequate

SA = Sufficiently Available (4)-Available and adequate for the school needs

S/N	ICT Facility/Resource	NA	MA	SA
i	Desk top Computers for teachers & pupils use			
ii	Interactive white boards			
iii	Overhead projectors			
iv	Internet connection			
v	Laptops for teachers			
vi	Source of electric power			
vii	Tablets for pupils			
viii	VCD/DVD Player			
ix	Video recorder/player			
x	Copy scanner			
xi	Photocopy Machine			
xii	Television			
xiii	Radio			
xiv	Digital Camera			
xv	Wifi			
xvi	Fax machine			

SECTION C: Level of ICT Integration in Teaching and Learning

6. Please indicate your level of agreement or disagreement in regard to the following statements: SD=Strongly Disagree D= Disagree A= Agree SA = Strongly Agree

Statement I use ICT in teaching and learning	SD	D	A	SA
to prepare lesson and reports				
internet to search teaching material				
to communicate with students and parents				
especially computer and its applications				
to monitor and evaluate children progress or performance				
to make presentation slides/ delivery				
to provide and prepare online work or assignment				
I make use of the vast teaching aids from internet such as charts and pictures to enhance teaching in especially science and other subjects				
I sometimes teach using audio visual aids such as videos				
I use internet material to supplement what they get from text books				
I invest in a personal computer/laptop				
I encourage my learners to source information from internet				
I avoid using computers whenever I can				
Working with computers makes me feel isolated from other people				
Computers are difficult to use				
I store my information in a computer more than in files				

SECTION D: Teachers' ICT Literacy

7. Please rate your level of ICT literacy by considering the skills and knowledge you Possess in regard to computer use. NB. Try to be as honest as possible.

Level: 1 – None: The person has no understanding of technology and appropriate training

Is required to for developing technology competency

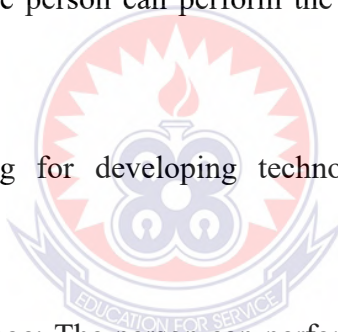
Level: 2 – Little: The person has a basic understanding of the technology, but cannot perform the task successfully without assistance-more training may be required

Level: 3 – Average: The person can perform the technology task, but struggles in some

areas. Advance training for developing technology competency will improve performance

Level: 4 – Above Average: The person can perform the technology task repeatedly with great success, but has not mastered all the elements.

Level: 5 – Master: The person has mastered the technology and can perform the task without any problems. The person can mentor others.



General Skills	None (1)	Little (2)	Average (3)	Above Average (4)	Master (5)
Familiar with basic computer system parts and concepts (e.g. motherboard, central processing unit (CPU), hard drive, random access memory-RAM, etc.)					
Able to use Help menus to find answers to my questions					

Understand file extensions and differences between file types (e.g. .doc, .gif, .html, .ppt, etc.)					
Able to shut down a computer appropriately					
Able to perform a safe reboot of the operating system with keystrokes					
Understand the difference between closing/minimizing/hiding windows and quitting a program					
Able to use the mouse right-click menu functions					
Able to install and uninstall a programme					
File Management Skills	1	2	3	4	5
Able to navigate through files and directories (e.g. using Windows Explorer)					
Able to organize, copy and paste files in directories					
Able to move unwanted files into my recycle bin and delete them permanently from my hard drive					
Word Processing Skills	1	2	3	4	5
Able to edit, copy, cut and paste a block of text or selected objects					
Able to use undo/redo functions					
Able to save, print and preview					

documents					
Able to select and change fonts sizes and types, styles (e.g. boldface, italics, underlining, etc.)					
Able to create itemized lists (e.g. bullets, numbered lists)					
Able to insert pages to a formal report with preliminaries and the main body					
Able to name and insert pages for tables and figures in a document					
Able to insert automatic table of contents					
Able to review a word document online					
Able to use picture tools formatting commands such as cropping and wrap text					
Able to use Equation editor					
Able to insert symbols					
Able to insert charts using excel					
Able to lock a document with a pass word					
Able to share information through Google drive sheets					
Able to put several files in a zip					
Printing Skills	1	2	3	4	5
Able to change printer parameters like page numbers, paper orientation, margins and proportions, etc.					

Able to change printing options from grayscale, normal, fastdraft or best					
Online Communication. Browser and Navigation Skills Online	1	2	3	4	5
I am able to use the browser basic commands to surf the Internet					
I am able to request, activate my ODU email account					
I am able to compose, send, receive, reply to and forward email messages					
I am able to attach/detach documents to/from email messages					
I am able to use search engines to locate desired information					
I am able to understand the difference between Search Engines (e.g. Google) and Directories (e.g. Yahoo)					
I am able to understand that some copyright restrictions apply to computer software and Internet documents					
I am able to understand how I can use gathered information from the Internet without violating copyright laws					
I am able to demonstrate an understanding of what constitutes plagiarism					

I am able to know basic steps to ensure my online privacy and computer security					
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Identify three (3) challenges you face in integrating ICT in teaching and learning.

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