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TEACHERS' PERCEPTIONS ABOUT THE USE OF TECHNOLOGY IN THE CLASSROOM IN BASIC SCHOOLS IN GHANA

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Abstract:
The aim of this study is to examine teachers' perceptions concerning the use of technology as a tool that enhances teaching and learning in the classroom for basic schools in Ghana. The study seeks to identify the gains and challenges associated with basic school teachers that could promote or impede the usage of technology in the classroom. Their teaching, problems that can cause the use of it and limitations. The study analyzed the teacher's perceptions, whether negative and positive, towards technology use in the classroom.
The study was conducted using a sample collected from four regions of Ghana. The number of participants involved was 200, and the instrument was a questionnaire with 60 questions based on a Likert-scale type. The main statistical tools used in analyzing the data included frequency, percentages, standard deviation, mean, and hierarchical regression analysis.
The results from the study show that basic school teachers in Ghana generally exhibited a positive perception and attitude for using technology in the classroom. Participants who are younger or have less teaching experience were more willing to adopt to the use of technology in the classroom compared to teachers with much teaching experience.
The conclusions of this study reveal that basic school teachers were generally of a positive attitude towards the use of technology in the classroom. They also consider technology to be optimistic to their pupils. The teachers acknowledged how beneficial the implementation and use of technology in classrooms could enhance their teaching performance. Also, most of the teachers suggest that limited resources and skills training could impede effective usage of technology in the classroom.
This research work could for addressing some of the challenging associated with one main stakeholder such teachers with regards to the effective implementation of technology in the classroom for teaching and learning purposes.

Keywords: Technology, perception, basic school, teacher, classroom.

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1 INTRODUCTION

The main background of this study is explained with some literature materials that concern the topic for the current study in this section. The section also highlights the significance of the study, the scope and how the thesis is structured.

1.1 Background

Technology has become the main driver of civilization in recent times, thereby being described as the greatest gift for humanity. According to Sutton (2013) since its inception technology has controlled generally every activity due to its impact on various disciplines. Thus, over the last two decades, many cellular devices have found their way into society, which has changed the way people interact. Given the rapid advancement and reliance on technology in society, Cascio and Montealgre (2016) iterate that its impact is significantly changing the working environment concerning inputs and outcome (performance). This implies that the penetration of technology has transformed the working system. This is because of the introduction of the use of clouds and mobile communicating, sensors, robotics among several others.

The use of technology in the education has not only made academic work faster and easier but has improved knowledge and contributed to high productivity levels for both teachers and students (Kwesani, Banerjee & Patni, 2008). For instance, Raja and Nagasubramani (2018) indicated that the introduction of technological tools such as software in education enriches classroom learning. Thus, technology has aided the transfer of knowledge in a convenient way where there is an interactive means of learning. Because of this, it has become imperative that technology in schools is regularized to enhance teaching and learning. Martin (2007) asserts that technology in education bares a well-founded pedagogy that serves that interest of students both in and outside a country. One such means is online education that facilitates a convenient academic process; thus, the language of one state can be translated easily to enhance teaching and learning. Ascough (2002) is of the view that effective education requires the awareness of the opportunities and limitations of the model of education. Therefore, technology comes as a medium through which increase educational success.

The presence of technology at all levels of education is undoubtedly a fundamental aid for improved teaching and learning as many developed countries who have used technology

have far advanced in education. Thus, Klopfer, Osterweil, Groff and Haas (2009) affirms that technology and education are closely related, hence the tendency for it to improve teaching and learning. However, if they are not used appropriately, the link between knowledge and accomplishment will be lost. Therefore, effective integration of technology depends on several factors, including teachers' positive attitudes and perception concerning its use in the classroom as well as their competencies about usage (Gorder, 2008; Selvi, 2010). To achieve that, many countries have introduced IT models into school curricula and hence implemented technology training sessions to improve teacher competencies which attract, values, attitudes and practice (Khan, 2014).

Despite the link established between technology and education, factors such as perception and attitudes towards the use of technology in the classroom cannot be overlooked. Besides that, numerous studies, however, have shown that the use of technology impacts immensely in teaching and learning. Thus, a lot of studies have been conducted to ascertain that fact. One of such is Mundy, Kupcczynski and Kee (2012) whose study examined the perception of teachers regarding the use of technology in schools in the USA. This study involved teachers who underwent technology empowerment sessions. The results indicated that teachers perceived a significant increase in engagement during teaching and learning, as well as the enthusiasm of students to learn more when technology is used in the classroom.

In Pakistan, Zehra and Bilwani (2016) examined and compared the perceptions of teachers in elite and mediocre schools in Karachi. The study was carried out using the exploratory design coupled with a qualitative approach to address the research questions. From this study, teachers' perception and attitude were favorable towards technology use in the classroom. Unlike Zehra and Bilwani's (2016) work, Ansong-Gyimah and Sarfo's (2010) study involved teachers, students and the educational officers examined their perception on the role of computers in the classroom. The results, however, revealed diverse views concerning the role of computers in schools. The study suggested that students had a higher positive perception about the use of computers compared with teachers about in terms of the effect of the technological tool on the quality of teaching and learning. Boadu (2014) revealed that teachers had a strong perception of the importance of technology in teaching history in secondary schools. These studies were done involving second cycle and tertiary institutions. Based on this background, the study seeks to examine the perception of teachers on the use of technology in basic schools.

In the past, the development of a country was built on both natural and human resources and literature suggests that the latter is more crucial in national development than the former (Slaus & Jacobs, 2011). For instance, human resources have been more engaged in schools to impact knowledge into learners. On the other hand, technology has lately been noted to facilitate many challenging activities and have many times been used to replace outmoded practices, functions and style of engaging students in academia. Technology is, however, skewed towards the industrial discipline of Ghana's economy, thereby increasing a technological gap between education and industry. Thus, technology is far advanced in business, sports, mining and health. Ghana's educational systems lag because according to Jackson (2019), the country has not been able to adapt and integrate technology into its education. This could be associated to some factors, including high incompetence levels and reduced perception of teachers since they could be kept out of the teaching field.

In that respect literature, various studies like Aminiu and Samah (2019); Dogan (2010) and Boaten (2007) have suggested the critical role technology could play in the learning environment and the outcome of its integration into education. The study by Dogan (2010) used data obtained from 2008-2009 academic years which is over a decade ago. There has been relatively a considerable amount of time between Dogan's work and now as much has happened over this period concerning technology. Thus, the data cannot be related to the current educational system with the existence of technology. Also, the use of descriptive design, which is characterized by observational, cannot allow for a repetition currently since there have been changes over the period.

Besides that, Aminu and Samah's (2019) work through current, involved less than 50 teachers whose responses cannot be generalized since a small sample size reduces the reliability of the results of the survey thereby increasing variability and the margin of error. Similar to Dogan (2010), Boateng's (2007) study is over a decade. Hence, the results cannot be used to make current generalizations considering the advancement in technology. Also, the study only focused on rural secondary education whose geographical location might affect the result of the study. Given these, there is the need to carry out this study since the literature gap has been identified. Thus, the current study focused on examining the perception of teachers about the use of technology in the classroom in basic schools in Ghana.

1.2 Significance of the study

Perception and visualization have become more critical in the learning process, which is noted to improve teaching and to learn in the educational system, especially for developing nations such as Ghana. Hence, the study result can contribute significantly to the Ghana Educational system regarding how teachers' attitude could influence the use of technology in the classroom. This is because the perception and attitudes of teachers will be determined, and this will inform the appropriate sector (s) within the educational system to formulate policies that will incorporate technology into academic curricula. For the effective implementation of this policy, the empowerment of teachers will play a key role in the formulated policy. This study will provide the opportunity to assess the general view of precautions for teachers to address any potential negative perception and acquire positive conceptions about technology. The study results will also serve as a reference for future studies. Consequently, based on the results obtained from this study, it could be useful for future curriculum development by policymakers in the educational sector to some background information for the implementation of ICT in teaching and learning purposes in the classroom from the perspective of teachers' opinion are concerned.

1.3 Scope and organization of the study

The study seeks to examine the perception of teachers about the use of technology in the classroom in basic schools in Ghana. The research is focused on teachers of basic schools within four regions in Ghana out of sixteen Regions which included Asanti Region, Northern Region, Upper East and the Greater Accra Region of Ghana. The selection of the sample population structure gives better sample teachers opinion in the context of Ghana. The study is only considered to the use of a quantitative method which gives a better understanding of the research problem yielding complete evidence. Thus, this will help to address the research objectives appropriately. This study consists of six main chapters.

Chapter one presents the introduction of the study. Chapter two focuses on the theoretical framework and review of literature related studies where the main concepts and definitions associated with this study are explained. The chapter is structured under the introduction, conceptual framework and empirical review. The chapter further emphasizes the classroom technology use, technology to support learning such as computer-supported collaborative learning (CSCL) and technology-enhanced learning. Additionally, teachers involvement in

technology, factors that affect the use of technology, where empirical reviews such as teachers' attitude or perception of technology use in the classroom, type of technology used by teachers in the classroom, how technology used in the classroom and factors that affect the use of technology.

Chapter three covers the aims, research questions and methodology. The methodology comprises of features such as the context and participants, sample size determination, data collection procedure, and data analysis process. Chapter four covers the presentation of the results of data analysis and are presented based on the research questions and objectives. Chapter five the discussion of these results, which demonstrate the interpretation of the results, supported with some literature associated with results analysis and significance of results. Finally, chapter six presents the summary, limitation, reliability and validity, conclusion and recommendations for the study.

2 THEORETICAL FRAMEWORK

This chapter reviews studies that relate to the current research topic under the research objectives. The chapter provides and discusses the main terms used in this research work under sub-sections constituting conceptual review. Furthermore, this section covers the explanation of the terms in the research topic. Thus, it provides a generalized idea concerning the subject matter. These include the use of technology in teaching and learning, teacher's role in technology use, teacher's attitude towards technology usage as well as factors that affect the use of technology.

2.1 Classroom Technology Usage

Bozemann (2000), describes technology as a process that enables people to perform functions efficiently, which is generally applicable to all works. Thanyi and Roath (2002) also add that technology is a kind of information that is not easily reproducible and transferable; hence, known as tacit knowledge. In defining the term technology; however, all the elements must be understood as linked to each other whereby a variation in one aspect can cause an impact in the other. Given this, technology can be said to be inseparable.

Using these elements above, Isman (2012) defines technology as the practical application of knowledge in a particular discipline. This can be explained as a manner of accomplishing a task with the help of applying a technical process or methods and knowledge. Wahab (2012) also add that technology can be defined as consisting of the necessary knowledge system, technical support (software) and a capital embodied technology (hardware). In a nutshell, the definition of technology is envisaged in terms of object, knowledge, process, volition and applied science.

Recent trends in education require a significant shift from the mere provision of technological tools in the educational environment into a comprehensive use of technology. Royer (2002) suggested that the more teachers were involved in preparing the classroom for technology, and more possibilities are provided for them to use that technology for instruction. The use of ICT in classrooms provides innovative opportunities that assist in increasing the efficiency and effectiveness of teaching and learning. However, implementation of technology potentially could have an impact on the educational theory and its application to the education curriculum. Wang (2002) illustrates that teachers perceive their roles as being

more teacher-centered and less student-centered in classrooms that did not have computers. Additionally, the use of computers and other technological accessories are considered essential tools for the 21st century compared to the previous generations where the use of pencil and paper were considered as the primary learning tool (Ntoliopoulou, 1998).

Nevertheless, teachers did not realize that their roles would be different in a classroom with computers. (Snoeyink & Ertmer, 2001–2002) suggests that teachers' skills and beliefs about the use of technology can influence their adaptation of technology. Also, Zhao and Frank (2003) said, teachers' ideas, experiences, pedagogy, and technological skills can influence technology integration into the school culture. Beliefs are personal and challenging to address in staff development and take time to change, and even if they do change, the process can take years.

The use of technology in the classroom is much related to teachers' attitudes towards addressing the technological barriers inherent in the traditional deployment of technology in schools. These barriers reflect the school culture and affect a teacher's belief system or self-efficacy and the ultimate impact of using technology in the classroom. Brzycki and Dudt (2005) suggest that there are some difficulties and challenges such as time, support, models, infrastructure, and culture that continue to reappear with new technologies applications technology in the teaching and learning.

The introduction of technology in an organization requires that training of staff is carried out to ensure the effective use of the accessory such as new equipment for the implementation of the latest Technology (Emad, 2010). This concept applies to the use of ICT in the classroom since most staff, such as teachers, are the main stakeholder in the implementation of ICT in classrooms.

2.2 Technology to support learning

Collaborative learning (CL) and Computer-supported collaborative learning (CSCL)

Collaborative learning (CL) can be defined as an educational approach to teaching and learning with the involving of small groups of the student (learners) to solve a problem or complete a task thereby promoting collaboration among themselves towards enhancing and optimizing each other's learning capacities (Johnson & Johnson, 1999, Marjan Laal & Seyed Mohammad Ghodsi, 2012).

According to Domingo (2008), collaborative learning requires teamwork with clearly defined assigned roles and not just working together as a group, ensures the task is accomplished. (Marjan Laal and Seyed Mohammad Ghodsi, 2012, Panitz, 1999) recognizing the contribution of CL to the learning process, described the benefits of CL into four main categories. These include; academic benefit (promotes student critical thinking skills and active involvement in the learning process), psychological benefit, (reduces anxiety and improves students' self-esteem through active cooperation) and social benefit (ensures collaboration and build diversity and understanding among students).

In Collaborative learning, the process of working together towards achieving the group target is generally the wish of all members, however research studies conducted by Lasse Lipponen, 199 identified some obstacles associated to the effectiveness of CL. The challenges related to CL demonstrated by Lasse Lipponen (1999) includes students' lack of collaborative skills, competence status, free-riding attributable impediments such as lack of interpersonal and teamwork skills.

The introduction of technological tools such as computers and additionally, the introduction of collaborative learning in small groups become increasingly has become essential in the educational system. Therefore, Computer-supported collaborative learning (CSCL) according to Stahl, G., Koschmann, & Suthers, D. (2006) emerging branch of the learning sciences concerned with studying how students can learn together aided with computers. Furthermore, computer-supported collaborative learning (CSCL) can also be explained as where a group of learners' construct knowledge through negotiation, explanation, argumentation and interaction using technology (Kreijns, Kirschner, & Jochems, 2003; Stahl et al., 2006). CSCL promotes 21st-century skills such as critical thinking, information and media literacy, creativity, communication skills, collaboration, and contextual learning, the CSCL approach in classroom learning is needed (Lambert & Cuper, 2008).

Also, Wang and Kinuthia (2004) define technology-enhanced learning environments as having four characteristics: 'the use of technology to motivate students, the use of technology to enhanced teaching and learning materials, the use technology during the teaching process to implement learning and instructional strategies and the use of technology for assessment of learning outcomes and objectives. A computer environment can improve the magnitude and quality of social interaction among students and between teachers and students (Brandon & Hollingshead 1999).

2.3 The role of teachers in technology usage

The implementation of technology in the classroom generally depends on the part played by teachers. Teachers are responsible for creating a very creative and exciting environment in the classroom that meets student needs (Clements, 1995; Kleiman, 2000). The application of technology in the classroom to enhance students learning process requires that the teachers are given the necessary training that makes them competent, capable and well informed about the use of technological tools available for teaching. Also, the approach of teaching and its impact on the children's learning ability needs to be considered since it can affect the learner's development and relationships (Bolstad, 2004).
Generally, some teachers have a perception about the use or even may not be interested in using technology in the classroom. The use of technology should be structured in a way that teachers are encouraged to actively participate in assisting students in developing their interest in using ICT as a learning tool. Kelley (2002) illustrated that there is a challenge of effectively implementing technology as a result of lack of proper training for teachers. Therefore, it is important to give teachers enough time to explore and understand how best they could use the technological tools available for effective teaching and impact positively on the student learning process.

2.3.1 Teachers perception about technology

Perception can be described as attitudes, behaviors, self-beliefs, and views that a person has developed towards anything (Boulton,1997). Based on Boulton's description of perception and relating to the scope of this study, teachers' perceptions could be referred to as the attitudes, behaviors, self-beliefs, opinions or views and the understanding of what teachers hold towards the application of technology in a learning environment such as ICT in education. Teachers' perceptions could also explain the beliefs/views that teachers have about the relevance of integrating technology into teaching and learning. Furthermore, teachers' perceptions using technology could indicate about the teachers' opinions/beliefs, including their self-efficacy on technology usage into teaching and learning.

According to Wang (2002), the teacher's perception of the use of technology could be explained as to how teachers regard, understand and interpret the use of technology in teaching and learning. Perceptions teachers exhibit towards the use of technological tools such as computers in teaching and learning are important factors to the success or failure of the use

of ICT in education system (Apeanti, 2014). Yan and Zhao (2006) suggest that technology adoption lies in teachers' goals and perceptions. Warschauer (2007) established that schools with a higher socio-economic status integrated technology more easily because teachers are confident that students usually have access to computers for their daily activities. Schools with a lower socioeconomic status could compensate for this difference by providing them with laptops for home use or making computer laboratories or room available all the time for more efficient use. According to Warschauer (2007), boys tend to use computers for activities such as gaming, and girls prefer to use it for communication and networking. Schools are, therefore required to develop more effective strategies by incorporating technology in the classroom for teaching and learning.

The availability and use of technology in the classroom allow students to engage in a more productive way of thinking, literally a hands-on learning experience in which makes teaching and learning more practical and entertaining for students. Hence, they can develop and accomplish skills that would be impossible with the traditional method of teaching.

The introduction of ICT affects the way teachers traditionally approach teaching more innovatively. Generally, teachers are involved in setting up the needed technological tools in the classroom and will potentially have a positive perception to use technology for instruction (Royer, 2002). However, some experienced teachers, especially the older generation, still have misconceptions or opinions about the use of technologies for the educational field (Lyle 2009). Therefore, teachers with no or less ICT experience are most probably will not be motivated to use technology in the classroom since they may not appreciate the benefits of using ICT to aim in teaching (Cope & Ward, 2002).

2.4 Appropriate Use of Technology in teaching and learning

The use of technology could now be considered as an essential component in education since it enhances how subjects are taught in the classroom and have the potential for transforming a learning environment to a more interactive one (Lowerison, Sclater, Schmid, & Abrami 2006). Although the use of technology in classrooms is generally considered to progress positively in teaching and learning, the implementation and its effectiveness are greatly influenced by the purpose and the skills of the person using it (Burbules & Callister 2000). The nature of ICT training and skills offered to teachers affects their way of delivery and the appropriate use of ICT in the classroom. Therefore, the selection of ICT tools and decisions

suitable for the learning environment supports the children learning ability (Bolstad, 2004) since teachers serve as facilitators and intermediate between technology and the classroom (Livingstone 2012).

The integration of ICT into the classroom could be a powerful tool, and when effectively implemented can enhance the learning of school children. Additionally, the technology used appropriately in the classroom could be an influential tool that enhances the learner's potential and facilitates the learning process (Wardle, 2002).

2.5 Factors that affect the use of technology

The application of technology in the classroom continues to see as a growing phenomenon. However, the implementation and its integration have some challenges as identified by Gebremedhin and Fenta (2015) such as limited technological infrastructure and lack of technical assistance on the part of the main stakeholders' such as teachers. The potential challenges associated with the use of technology can be classified as extrinsic and intrinsic factors.

2.5.1 Extrinsic factors

Various aspects of people's lives are shaped by circumstances surrounding them as such extrinsic factors refer to the details related to the social environment. Thus, external factors such as the learning environment tend to contribute to a learner's cognitive development and learning abilities (Sizer, Sawyer, Felstehausen & Couch, 2008). Adaptation of ideas or trends, including technology, also impacts on the users' ability to perform. In that regard, relation to the use of technology is influenced by environmental conditions. Some of these extrinsic factors can either constrain teachers from using technologies in the classrooms, and others also enable them to. Those affecting the use of technology include limited accessibility, limited technical support, lack of technological training. Ramnarain (2016) indicates that a lack of professional help (technological experts to train trainees), and school policies and access to technological infrastructure indeed constraints teachers to use technology in classrooms. According to Ertmer, Ottenbreit-Leftwich and York (2006), enabling factors that hinder the success of using technology in the classroom also includes access to hardware, quality software, reliable internet connectivity, technical support, as well as administrative and peer support.

2.5.2 Intrinsic factors

Just as surrounding factors influence the intention of using technology, inherent factors tend to lead people to develop the plan toward using technology. These are simply noted through attitudes and behaviour of people and hence are known as intrinsic factors. Sizer et al. (2008) iterate that intrinsic factors like the extrinsic factors also contribute to a learner's cognitive development and learning abilities. The personal characteristics of teachers influence the implementation of technology in the classroom. Personal characteristics affect the usage of technology by teachers, as Buaben-Andoh (2012) reveals that age and gender, lack of time on the part of the teacher, low self-esteem, and incompetence.

The provision of technological tools in the classroom environment is not enough to ensure the effective use and implementation when the stakeholders are not adequately trained to use these tools. The main potential challenge which could be encountered in implementing technology in schools can be because of a lack of practical training of teachers on how to use technology efficiently in the classroom (Kelley, 2002).

Generally, the decision concerning the integration of new technologies into the classrooms for teaching and learning purposes is usually determined by policymakers, where little or no inputs from teachers concerning the use, efficiency, and benefits of the new technology. This situation where policymakers are interested in incorporating technology into the classroom, within a short period, therefore limiting or no paying full attention to the implementers (teachers) of the technology, could be attributable to extra cost and require time for detailed training of the teachers (Cuban, 1996). According to Gebremedhin and Fenta (2015) factors that could be a challenge and potentially have negative implications on the teacher's ability to deliver with the use of technology include; lack of technical support, insufficient encouragement for teachers and shortage of resources or technological.

Another factor which could contribute to how technology is used in the classroom could be attributable to limited access or supply the needed technological tools. Inadequate technical support may not motivate teachers. The accessibility to technology, such as computers to the students, could affect how the learners appreciate and acquire skills with the use of technology in schools. In developing countries where technology in school was recently introduced mostly have a challenge with the accessibility of computers since there are not usually enough resources to provide for every student. Therefore, schools mostly have computer laboratories instead of having computers or technological learning tools in their classrooms.

Kelly (2000) suggested that students with access to technology in their incorporated classrooms demonstrate to have improved confidence and competence in computer skills compared with those who use computer laboratories away from the classroom.

These factors which negatively affect the use of technology in the classroom could be grouped as extrinsic and intrinsic barriers (Brickner, 1995; Ertmer, 1999). The extrinsic barriers include environmental issues and resources while intrinsic barriers are associated with teacher's personal instructional experiences, views, beliefs and strategies. Teachers encounter many challenges as results of intrinsic barriers, which affect their decision-making processes and classroom practices (Ertmer, 1999). Majority of teachers hold the view that extrinsic restrictions prevent teachers from using technology in teaching and learning. In support Cuban, Kirkpatrick, and Peck (2001), and Bauer and Kenton, (2005) cite time to learn and prepare instruction as barriers that hinder teachers from utilising technology in the classroom. Inadequate professional development (Koehler & Mishra, 2005) and access to equipment (Yan & Zhao, 2006) also contribute to extrinsic barriers.

2.6 Empirical review

This section is used to illustrate a review of studies that are related to the topic. The review is done under specific objectives.

2.6.1 Teachers' attitude or perception of technology use in the classroom

A recent study by Aminu and Samah (2019) examined the perception of teachers training on the use of technology and integrating into instructional delivery. The study involved 40 teachers from Zamfara State from whom questionnaires were used to solicit information. The study revealed that the teachers exhibited positive thoughts and attitude towards the use of technology, including the usefulness of the technology (increases academic achievements, enhancing interaction between students and ensures active students classroom participation). Also, the study found out that the teachers thought of how easily they could choose instructional materials. Consequently, the perception of teachers on training and use of technology was found to improve their teaching practice. These are believed to influence teachers' decisions to use technology.

Similarly, Jatileni and Jatileni (2018) also assessed teachers' perception on the use of ICT teaching and learning in Namibia's primary education. The study adopted a quantitative approach and involved ninety teachers. Questionnaires were designed and used to collect data from the respondents. The study found out that the teachers agreed to the ICT improving their teaching practices and learning. According to the study, teachers decide to use technology in teaching and learning purposes based on accessibility and availability of the devices, the lesson objectives, subject policy, curriculum, learners' diverse learning needs. Furthermore, males' teachers were found to be using ICT than female teachers. From the study, it can be deduced that facilitating conditions influence the usage of technology

Furthermore, Sanchez, Marcos, Gonzalez and Guanlin (2012) also investigated teachers' attitude towards the use of ICT in the classroom. A total of 157 teachers from the kindergarten level to the high school level were involved in the study. The study adopted a quasi-experimental design. The findings revealed that teachers' attitude towards the use of ICT was very positive. The ICT allowed them to access teaching resources to teach; it enhances teaching methodology and helps to obtain resources to evaluate students. This can be associated with perceived usefulness and perceived ease of use.

2.6.2 Type of Technology used by teachers in the classroom

As mentioned earlier, the technology consists of various forms, including knowledge (information), the software part (intangible technology) and the tangible hardware. Hence, any of these aforementioned means could be used by organisations as educational institutions are not left out. Given this, the classrooms of schools that use technology as teaching and learning aid are furnished with technology in the hardware form, which houses the software part technology (Ghaviferkr & Rosdy, 2015). These include a desktop computer, laptop, system unit, keyboard, mouse, smart boards and digital cameras (Capaldo, Flanagan & Littrelll, 2008).

An interview of teachers reports by Capaldo et al., (2008) on the type of technology used in basic classrooms suggests that teachers utilize educational software some of which include drill and practice (math blaster, Jumpstart series). Teachers use this visual learning material to help students master their academic skills, thereby increasing attention in class and making teaching enjoyable. According to the report, search engines and the internet are also often used as teachers indicate these technological tools bring the world to the classrooms. Besides

that, it is of importance to note that access to the internet assists both teachers and learners in obtaining instant answers. Furthermore, teachers also use Microsoft word to write out their mandatory weekly lessons and to draw their educational programmes for the semester. The Microsoft Office is also used by students for drawing and illustration purposes, thus creating patterns and designs as well as creating posters by way of using Adobe Photoshop CS3.

In Spain, Imbernon, Silva and Guzman's (2010) study on teaching skills in virtual and blended learning environments revealed a university using the internet for purposes of e-learning and b-learning. To make progress with this study, the authors adopted the case study design and the qualitative approach. Findings from the study indicated that the teaching staff utilised Information Communication Technology to improve students learning through setting digital platforms as support for teaching. It can then be deduced from the study that tutors could run tutorial sessions in the comfort of their homes as the students. This thus encourages interactive and participatory learning.

2.6.3 How technology used in the classroom

Technology plays an essential role in every aspect of life, and its application has increased greater efficiency in critical processes. Thus, highlighting its effectiveness, Raja and Nagasubramani (2018) indicate that technology has made it easier for both teachers and students to enhance their knowledge in any discipline. They can search the internet to learn more about a topic being treated in the classroom, as well as students, learn from other tutors via video learning.

A study conducted by Vassall and Warren (2018) on the use of technology in the classroom was done among primary and secondary schools in Australia. The authors utilised the longitudinal study means covering nine years (2006-2014). The study indicated the schools run "Bring Your Own Device" as part of the Australian government Digital Education Revolution. The study findings suggest that technology is used to practice reading as well as written text and conduct research in the English classroom. Further, the students use the technology available to them to create graphics, contribute to blogs and networking to complete assignments.

On the other hand, a study by Eady and Lockyer (2013) identifies how teachers patronize technology. The study submits that use digital resources for a variety of purposes, including introducing a topic to students, for demonstrating abstract ideas during learning. Also, teachers use technology to engage students outside classroom activities like tutorials, making inputs in semester assignments.

2.6.4 Factors that affect teachers use of technology

Many studies have indicated the impact of technology integration in educational processes. However, not all teachers have embraced technology usage into the classrooms. On that note, Hew and Brush (2007) indicate that there are barriers to using technology in the classrooms which are associated with a lack of teacher technological skill, attitudes, beliefs. Also, some level of difficulty is attributed to technical support by institutions, including the availability of resources for schools and teachers to use. Butler and Selbom (2002) also emphasise that reliability is a major contributing factor for poor patronisation of technology in the classrooms. Reliability has to do with the availability of hardware, incompatible software between home and school, slow internet connectivity and out-moded software.

Similarly, Afshari, Bakar, Luan, Samah and Fooi (2009) conducted a study on factors affecting teachers' use of information and communication technology. The study reviewed past studies to arrive at their conclusion. The findings from the study reveal that teachers' decision to use technology in the classroom is dependent on two interrelated factors, namely non-manipulative and manipulative school and teacher factor. The former includes teachers demographics like age, gender, educational level. The latter, however, relates to the inability of technological institutions to develop training programmes for their teachers. This implies that none of these factors is independent of the success of the integration of ICT into instructional periods.

Likewise, Chigona and Chgona's (2010) study on factors affecting the use of ICT for teaching in the Western Cape School, south Africa also disclosed an exciting point of views. The study used a qualitative approach to examine issues regarding teaching and learning using ICT. An in-depth interview was done involving 14 educationists and two other personnel. The study revealed that personal characteristics (Literacy and gender, mental condition), social issues (public policies, power structure like politics as well as environmental concerns (lack of resources or infrastructure) account for teachers not using technology.

2.7 Ghanaian educational policies on technology

The realisation of the importance of Technology in Ghanaian education began after the educational reforms of 1987 to 1996 and between 1996 and 2004. The recognition of the value of Technology in Ghanaian education did not emerge until 1987 when the education system was restructured. The first educational reforms were launched in 1974, but it was not until 1987 that educational policies emphasized the importance of science and technology. In 1998, a review and analysis of education were embraced by the Ghanaian branch of the Educational Research Network for West and Central Africa (ERNWACA). This review of education in Ghana focused on the period between 1987 and 1998. Within the same period, the Ministry of Education established three strategic objectives namely; improving the management efficiency and enhancing the quality of teaching and learning in the educational sector, and improved access science and technology in basic education, of which access to science and technology was given the topmost priority.

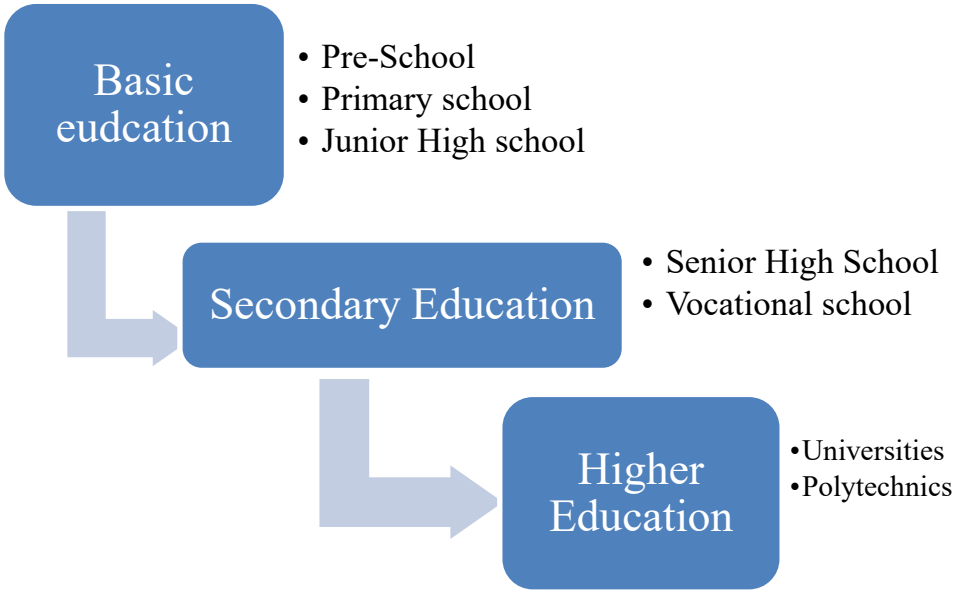
This review noticed that there was inadequate research on the applications of science and technology in Ghanaian education. In 1997, Ghana had a program "*Ghana Vision 2020*" that had the First Medium-Term Development Plan between1997-2000. The objective was to identify issues that needed attention for Ghana to face the challenges of the 21st century. It proposed an increase in access to education across all levels in society. In 2000, a draft of the Information Technology Policy Framework for Ghana was published by the Ghanaian government. This document had information on the development of the telecommunications industry, and information and communications technologies (ICTs) in all aspects of the Ghanaian social, economic and political life. In the educational, the government established the National Council for Information Technology in Education (NCITE) within the Ministry of Education for the development of IT curricula. Currently, ICT is made a compulsory subject at all of education in Ghana. Also, ICT curricula were developed and used at all levels of education (nursery, kindergarten, primary, secondary, polytechnic and university).

Additionally, Ghana Institute of Information Technology (GIIT) is formed for the networking of universities and institutions of higher learning for distance education programs. The establishment of distance education virtual learning centres that will connect institutes of higher learning to pre-tertiary schools to make up for the shortages of qualified teachers. A

draft information technology policy framework for Ghana (2001) produced the Ghana ICT for Accelerated Development (ICT4AD) policy document, a comprehensive national IT plan. This policy prioritised the development and implementation of ICTs in education by concentrating efforts on the training, research and generation of resources for the expansion of ICTs.

The policy aimed at improving human, technical expertise in Ghana, and the training of experts and facilitators in the applications of ICTs in education. In achieving the set goals and objectives for this policy initiative, the approach to implementation was to improve the telecommunications infrastructure, and facilities in educational institutions (tertiary and pre-tertiary), and promote ICT driven instructional systems. Also, distance education through e-learning initiatives was identified as a possible way of improving access to education to the Ghanaian population as a whole. There have been a lot of efforts to ensure the necessary development when it comes to ICT by each successive government. The new recent curricular aimed at making sure teachers used ICT as a pedagogical tool during teaching and learning in the classroom. Figure 1 is used to illustrates the in a simplified form the structure and stage for Ghana educational system.

Figure 1. Simplified educational structure for Ghana.



3 METHODOLOGY

The main objectives for this study and the research questions are presented in this section. The methodology is made of the context, and participants used, data collection, procedure and instrument, analysis of data research design and approach.

3.1 Aims and Research Questions

The aim of this study is to examine and get a deeper understanding of the perception of teachers about the use of technology in the classroom in Basic Schools in Ghana. Analysing perception of teachers about the use of technology in the classroom is very important since their attitude will have an impact on the teaching and learning process. Through the current research, it offers an opportunity to identify teacher's perception either negative or positive attitude towards the use of technology in the classroom.

The research questions for the current research are as follows:

1. What attitudes or perceptions do teachers exhibit about use of technology in the classroom?

2. What type of technology is used by teachers in the classroom?

3. How is the technology used?

4. What factors affect the use of technology?

3.1.1 Hypothesis

The following hypothesis was used for the study:

H1: limited accessibility will negatively affect teacher's perception in using technology in the classroom.

H2: Lack of access to an internet connection will negatively affect teacher's perception in using technology in the classroom.

H3: Lack of effective training will negatively affect teacher's perception in using of technology in the classroom.

H4: Lack of time will negatively affect teacher's perception use of technology in the classroom

H4: Lack of technical support for computers will negatively affect teachers use of technology

H5: Lack of teacher's confidence (skills and knowledge) will negatively affect teacher's perception of using technology in the classroom.

H6: Lack of teacher's competency will negatively affect the use of technology in the classroom.

H7: Appropriate use of technology in the classroom will positively affect teacher's perception of using technology in the classroom.

3.2 Research method

The main focus of this study is to understand teachers' perceptions and attitudes towards the use of technology in the classroom using a quantitative approach (method). Quantitative research approach can be considered as a scientific to evaluate the research data such as numbers, and measurable figures assessed, thereby saving time and resources (Gorard, 2001; Connolly, 2007).

According to Williams and May (1998), the use of a quantitative approach could not be attributable to just a mere coincidence in the interpretation of the findings made from the studies. Additionally, Denscombe (1998) suggests that the potential issue of bias associated with either data collection or data analysis by the researcher is reduced in situations where the researcher is not in direct contact with the participants, through the use of other medium such emails, paper questionnaire or using the telephone to collects the research data. Consequently, based on the merits elaborated concerning the use of a quantitative approach by the other researchers, the researcher found this to be the most suitable method for this study.

The research approach uses a Likert scale questionnaire to illustrate how basic school teachers' attitude towards the use of technology in the classroom. Furthermore, the Likert scale questionnaire assisted in examining how the teachers (participants) rate their responses as negative, neutral, or positive to each question asked. The researcher developed the questionnaire and tested it with assistance from her supervisor.

3.2.1 Context and participants

The participants for this research work was carried out by selecting teachers from basic schools, the northern, Ashanti, Upper East and Greater Accra regions of Ghana randomly. These four Region forms part of sixteen political Regions in Ghana. In the context of the participants, they were from the northern sector, and southern sectors of Ghana where northern region and Upper East region are the northern sector and the southern sector are Ashanti and Greater Accra regions. In the context of Ghana, basic school refers to primary and junior high schools. The study focused on both classroom and subject teachers from the basic schools. Preliminary interactions my colleagues' teachers through workshops organized by the Ghana Education Service (GES) and other non-governmental organizations for teachers from different schools and educational level concerning the use of ICT in school, reveals how teachers perceive the use of ICT differently. Consequently, based on my previous work as a professional basic school teacher my motivation to investigate teachers' perception on the use of technology in the classroom such as in teaching and learning purposes from relatively wider sample population within Ghana.

The sampling technique used to get the participants was based on the researcher contacting eight teachers who work in various basic schools and two experts in technology from Ghana, who assisted the researcher for collecting the data. The researcher informed them about the purposes of the study. These respondents came from four regions out of sixteen and a total of sixteen schools. There was no consideration of gender and age for the purpose of this study.

3.2.2 Data collection

The questionnaires used for the research were developed, and the participants responded in the English language since this is the official and national language of instruction used in schools in Ghana. The questionnaires were sent to the teachers via e-mail teachers, where those having smartphones responded through online platforms while teachers without smartphones responded through offline completed the questionnaire on printed paper. The use of snowball sampling is not limited to the sampling frame, which extends sampling methodologies that promote sample diversity. The snowball sampling technique was performed by getting `be asking well-situated people or persons, who also know a lot of other

persons to be contacted for the sampling are also suggested by Patton (1999). Snowball sampling could be used as network research, and consequently have an advantage such as identifying the hidden populations during data collection, where the researcher is not able to reach.

Snowball sampling technique was used to collect a total of 200 respondents who are teachers from public primary, and junior high schools in Ghana, a sector where the researcher has taught (basic school) for almost five years. The research first conducted with some teachers who were a colleague of the researcher, and the chain continued until 200 teachers participated. The respondents were given 4 to 5 days to return the questionnaire. It took seven weeks to complete the data collection.

The questionnaires were close-ended questions, intending to provide the respondent opportunity to answer more questions within a reasonable short time and allow for more variables in a research study to be added. According to Ross (2005) explains close-ended questions could be used to restrict the respondents to a finite set of responses, therefore making it easy to answer and analyses. Survey questionnaire of a total of 60 items with Likert scale ranged from 1= totally disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = Totally agree. The questionnaire consists of 4 sections:

Section A was about the background information of the respondents, which consists of 5 items that include the name of the school, higher academic qualification, current skills of handling technology in classroom and teaching experience. The other three sections of the questionnaire focused on the teachers' perception of technology and how they use technology as well as factors hindering the use of technology in teaching and learning.

- *Section B* contains 34 items measuring both external and internal barriers that impede the use of technology in teaching and learning.

- *Section C* contains 9 items to define how teachers used technology in education,

- *Section D* consists of 17 items about teachers' attitude towards the use of technology. The researcher modified questionnaire originally developed Gulbahar and Guven (2008) to address her research questions in this quantitative study.

3.2.3 Data Analysis Process

The researcher analyzed all the data from the respondents using Statistical Package for the Social Sciences (SPSS) software (Connolly, 2007; Gorard, 2001). The main statistical tools used in analyzing the data included frequency, percentages, standard deviation, mean, and hierarchical regression analysis. Frequency, percentages, standard deviation means were used to describe research question labelled section A, B and C while hierarchical regression analysis was performed to analyze research labelled section D. One-way analysis of variance (ANOVA) and post hoc tests were used to analyze the background information of the respondents to determine if the number of years a teacher spent in the teaching field and their current skills affect their use of technology in teaching in the classroom.

4 RESULTS

This study aims to examine and get a deeper understanding of the perception of teachers about the use of technology in the teaching and learning process in basic schools in Ghana. From this perspective the following research questions were designed to achieve these aims which are, what attitudes or perceptions do teachers exhibit about use of technology in the classroom, what type of technology is used by teachers in the school, how do they use technology and finally what factors affect the use of technology. The results presented methodologies such as descriptive statistics, hierarchical regression analysis and ANOVA.

4.1 What attitudes or perceptions do teachers exhibit about use of technology in the classroom?

The descriptive statistics for the research question; what attitudes or perception teachers exhibit about use of technology in the classroom are presented in Table 1. Nine sets of questionnaires (Q1 – Q9) were presented to the participants that are the basic school teachers for their responses. It can be observed from Table 1 that questionnaire six (Q6)' *the use of technology facilitates the pupil's performance'* had the highest mean value of 3.41 and with 26 % of the respondents totally agreed to the question (Q6). The response for Q6 shows that the teachers interviewed generally accept that the use of technology could potentially play a role to enhance their pupil's performance compared to using only conventional teaching system. This view from the respondents shows from table 1 that combining the percentages of agree (31%) and totally agree (26%) exceeds 50%, further demonstrates that more than half of the total responses identify the relevance of technology that improves pupil output.

For Q3 (*The use of technology in education makes class distractive*), and Q9 (*I can still have an effective teaching without the use of technology*) shown in table 1 demonstrate to have the lowest mean value of 2.67. The responses based on Q3 and Q9 reveals that the teachers acknowledge the role of technology to teaching and the learning process in the classroom since they consider the use of technology to be less destructive to classroom activities and also recognize how technology could be used to improve on teaching. Additionally, the analysis for Q3 and Q9 have shown that percentage contribution for Q3 had 20.5% totally disagree and 27.5% for disagreeing which when combined was slightly below 50% when compared to Q9 percentage contribution of 26% for totally disagree and 28.5% for disagreeing was found to be above 50%.

For questionnaires (Q2, Q4, Q5, Q7 and Q8) the mean values range between 2.86 – 3.37 and for the percentage of respondents totally agree to these questions varied between 12 % – 25 %, agree ranged from 23.5 – 37.5 %. Also, 12 – 16.5 % totally disagree, 16 – 30.4 % were for the respondent that disagreed and with a neutral percentage range being 10 – 20, as illustrated in Table 1. Furthermore, Table 1 demonstrates the percentage contribution for each of the options made available on the Likert scale for the respondents. The percentage contribution for totally disagreeing and disagreeing for the questionnaire (Q2, Q4, Q5, Q7 and Q8) were less than 50 %. Q2 (The use of technology makes teaching and learning easier), Q4 (The use of technology in education enhances student's engagement) and Q7 (Social media such as WhatsApp makes communication easier among teachers) had the percentage contribution by combining totally agree and agree more 50% which indicated that teachers agreed to the fact social media makes communication easier among teachers and other stakeholders of education as shown in Table 1.

This is in contrast with Q1, Q5 and Q8 which had the addition for a set totally agree and agree, as well as totally disagree and disagree less than 50 %. For example, questionnaire Q1 that concerns the potential negative effect of computer-supported collaborative learning (CSCL) shows that only 45% opposing (totally disagree and disagree) to Q1, with a significant percentage (20%) remaining neutral in their response. The potential reason for Q2, Q4 and Q7 having more than 50% totally agreeing or agreeing to these questionnaires show that teachers as generally have a positive perception about the application of technology in basic schools in Ghana.

Table 1. Teachers attitudes or perception towards the use of technology in the classroom

	Question	Totally disagree n (%)	Disagree (%)	Neutral n (%)	Agree n (%)	Totally agree n (%)	M (SD)
Q1	The use of technology does not facilitate students in collaborative learning	31 (15.5)	61 (30.4)	40 (20)	40 (20)	28 (14)	2.86 (1.29)
Q2	The use of technology makes teaching and learning easier	24 (12)	32 (16)	29 (14.5)	75 (37.5)	40 (20)	3.37 (1.29)
Q3	The use of technology in education makes class distractive	41 (20.5)	55 (27.5)	44 (22)	48 (24)	12 (6)	2.67 (1.21)

Q4	The use of technology in teaching enhances student's engagement	24 (12)	52 (26)	20 (10)	54 (27)	50 (25)	3.27 (1.39)
Q5	The use of technology does not foster students in critical thinking	25 (12.5)	56 (28)	28 (14)	67 (33.5)	24 (12)	3.04 (1.26)
Q6	The use of technology facilitates the pupil's performance	25 (12.5)	33 (16.5)	28 (14)	62 (31)	52 (26)	3.41 (1.36)
Q7	Social media such as WhatsApp makes communication easier among teachers	33 (16.5)	41 (20.5)	24 (12)	62 (31)	40 (20)	3.17 (1.39)
Q8	I think the use of technology improves the quality of teaching	24 (12)	48 (24)	32 (16)	47 (23.5)	49 (24.5)	3.24 (1.37)
Q9	I can still have an effective teaching without the use of technology	52 (26)	57 (28.5)	19 (9.5)	48 (24)	24 (12)	2.67 (1.39)

4.2 What type of technology and how is used by Teachers in the classroom?

Figure 2 shows a bar chart the types of technological options available for teachers to use in the classroom. The use of software programs had dominated as the most used as a technological application in the classroom. The second highest features associated with the use of technology in the classroom is text, images online and graphs, and with the third-highest been the use of computers and laptops. These topmost three items could result from easy availability. The remaining questionnaire had almost the same from the respondents; this trend from the results could be as a result of the availability of ICT materials and facilities in basic schools in Ghana.

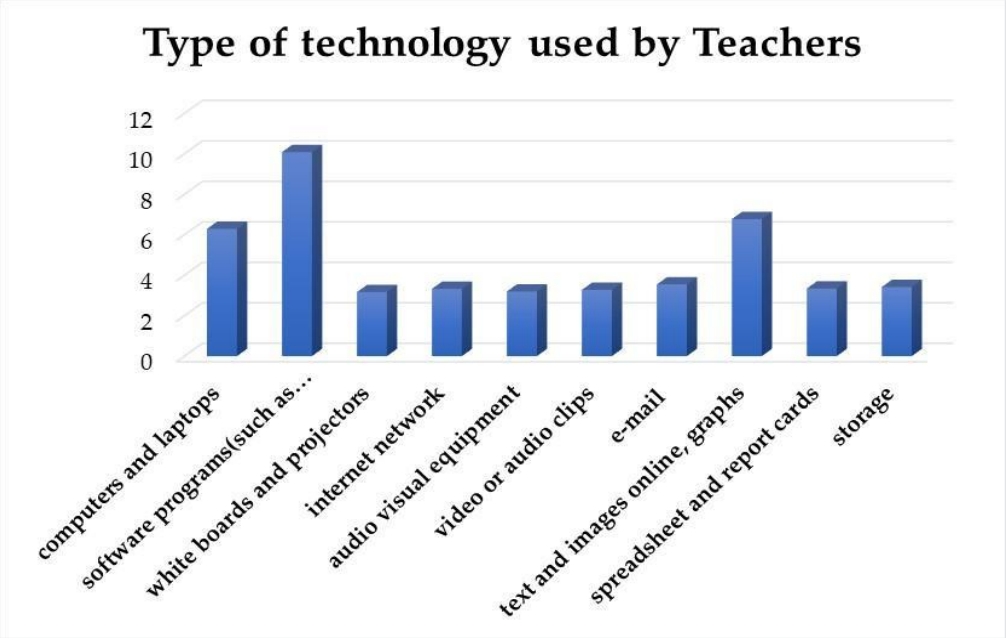


Figure 2. A bar chart the types of technological options available for teachers to use in the classroom.

Table 2 indicates the results based on the data obtained and analyzed from the research question' what type of technology is used by Teachers in the classroom' Based on descriptive statistics questionnaire Q17 (*that is' I email files to teachers and students*) as shown in Table 2 gives the mean of 3.54 as the highest value and with 70% of the respondents indicating to 'totally agree' and agree to the questionnaire. This demonstrates that the use of emails as a source of giving lessons materials in electronic form is relatively comfortable for the teachers. The next second-highest mean value is 3.48, with a percentage point based on response was 26.5% totally agree were associated with Q19 with the general majority (over 50%) of the respondent showing that they totally agree or they agree to they create text using the office word program. The use of Microsoft office word program is generally readily available and to use, therefore could be associated with response to Q19 having a relatively good figure of merits.

In Table 2, Q15 (*I use computers when implementing and assessing my lessons*) have the lowest mean value of 3.00, and slightly below the 50 % mark '*totally agree* (18%)' or agree (31.5%). Other questionnaires (Q10, Q11, Q12, Q13, Q14, Q16, Q18, Q20, Q21, Q22 and Q8) the mean values ranged between 3.16 – 3.42. The average mean (M) value of 3.3 illustrates that responses for (Q10, Q11, Q12, Q13, Q14, Q16, Q18, Q20, Q21, Q22 and Q8)

were generally impressive. The percentage of respondents that show a very positive response (totally agree and agree) to the questionnaire in this paragraph, varied between 51 % – 57 %, as shown in Table 2. Consequently, the percentage addition for *agreeing* and *totally agree* options for the surveys (Q10 – Q22) could be said to be higher than 50 % of the responses, except for Q15 that had 49.5%.

Furthermore, Table 2 shows the percentage contribution for other of the options (neutral, disagree and totally disagree) made available for the respondents to select. A combined of the percentage contribution for '*totally disagree*' and '*disagree*' to the questionnaires (Q10 – Q22) in table 2 were less than 50 %. Also, the neutral options in percentage terms show for the surveys (Q10 – Q22) in Table 2 ranged between 4.00 % – 16 % except for Q17, where the respondents had no option to be natural.

Table 2. What type of technology and how it is used by Teachers in the classroom.

Questionnaires		Totally disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Totally agree n (%)	M (SD)
Q10	I use computers and lap-tops in my school.	25 (12.5)	41 (20.5)	20 (10)	80 (40)	34 (17)	3.28 (1.30)
Q11	I use software programs like spreadsheet and word program.	28 (14)	41 (20.5)	26 (13)	61 (30.5)	44 (22)	3.26 (1.37)
Q12	I use whiteboards and projectors.	37 (18.5)	32 (16)	32 (16)	59 (29.5)	40 (20)	3.16 (1.40)
Q13	I use internet network in my school.	21 (10.5)	45 (22.5)	28 (14)	60 (30)	46 (23)	3.32 (1.32)
Q14	I use audiovisual equip-ment.	32 (16)	40 (20)	26 (13)	61 (30.5)	41 (20.5)	3.19 (1.39)
Q15	I use computers when implementing and as-sessing my lessons.	41 (20.5)	52 (26)	8 (4)	63 (31.5)	36 (18)	3.00 (1.45)
Q16	I create a presentation using video or audio clips.	26 (13)	48 (24)	24 (12)	49 (24.5)	53 (26.5)	3.27 (1.41)
Q17	I email files to teachers and students.	32 (16)	28 (14)	-	79 (39.5)	61 (30.5)	3.54 (1.45)

Q18	I edit text and images online.	28 (14)	28 (14)	26 (13)	65 (32.5)	53 (26.5)	3.42 (1.48)
Q19	I create text using office word program.	24 (12)	28 (14)	28 (14)	67 (33.5)	53 (26.5)	3.48 (1.33)
Q20	I use a spreadsheet for pupils to register and report cards.	28 (14)	33 (16.5)	28 (14)	65 (32.5)	46 (23)	3.34 (1.36)
Q21	I create folders to store my documents.	24 (12)	33 (16.5)	28 (14)	66 (33)	49 (24.5)	3.41 (1.33)
Q22	I use a spreadsheet to plot graphs.	28 (14)	37 (18.5)	20 (10)	69 (34.5)	46 (23)	3.34 (1.37)

4.3 What are the factors that affect the use of technology in the classroom

The hierarchical regression analysis presented in Table 3 shows that the first sets of predictors labelled as step 1 are: *lack of effective training, Lack of teachers' competency, Lack of confidence (knowledge and skills), perception or attitude* could be examined with 44.9 % variance in the dependent variable. For the independent variable, the predictors (labelled as step 2): *Lack of effective training, Lack of teachers' competency, Lack of confidence (knowledge and skills), perception or attitude, Lack of time, Limited accessibility, Environmental limitation, Lack of access to the internet connection, limited technical support for teachers* could be explained with an R^2 value of 84 % variance in the independent variable. Additionally, the accuracy of the model had a standard error of the estimate for predicting the dependent variable is 4.46 and for independent variable is 2.39.

Table 3 further shows the coefficients obtained based on the hierarchical regression analysis carried with figures of merits such as beta and significance (p-value) were estimated. In step 1, three variables of *perception or attitude*, *lack of confidence (knowledge and skills),* and *lack of effective training* had p-values of 0.000 relatively far below the p-value of 0.05. The use of standardised coefficient beta indicates the performance of the variables where a positive value gives a better prospect to evaluate the quantitative data. In Table 3, the most important independent variable is the perception or attitude with a best-standardised coefficient beta value of 0.439. Consequently, from the analysis p-value (significance) and best-

standardised coefficient beta shows with positive perception or attitude, there is a high probability that the respondent (the teachers) will be very willing to adopt and use technology in the classroom.

Table 3 further shows that the independent variable for lack of confidence (knowledge and skills) and lack of teachers' competency had good p-values of 0.000 and 0.020. These p-values could be generally considered as good since the values are below 0.05. However, negative standardised coefficient beta values were estimated for these independent variables where -0.395 was estimated for lack of confidence (knowledge and skills) and -0.138 for lack of teachers' competency. These two independent variables indicate that respondents who have these features may most likely consider the use of technology in the classroom as less useful to aid teaching and learning. Lack of effective training as independent variable generally had very good significance value of 0.000 and a positive standardised coefficient beta value of 0.417. These statistical parameter values show that with improved training for the respondents (teachers) could potentially motivate them to embrace the use of technology in the classroom.

Step 2 variables in table 3 further illustrate the independent variable attributable to both the teachers' attitude and external factors using hierarchical regression analysis and performance assessed with p-value and standardised coefficient beta. For the independent variables associated with external factors such as lack of effective training and limited technical support for teachers were the variables with relatively the best figure of merits as shown in the table. Lack of effective training and for limited technical support for teachers p-values of 0.000 with standardised coefficient beta ranging between 0.227 - 0.571. These variables indicate the teachers who participated in this study expressed the challenge of less training efforts made and may enhance the skills with regards to the use of technology in the classroom if effective training is carried out for them. Three of the independent variables also linked to external factors show considerable negative standardised coefficient beta. These variables are lack of time, lack of access to the internet connection and limited accessibility with a standardised coefficient beta between -0.468 – -0.045 and with a p-value below 0.05.

In summary Table 3, the independent variables were categorized into factors associated with teachers and external conditions. Variables linked to the teachers, such as had a standardised coefficient beta ranging between -0.93 – 0.717 compared to the external variables such as

that varied between 0.571 – -0.468. The main difference found between two sets of independent variables is that variables attributable to teachers' attitude had a more positive standardised coefficient beta value of 0.717 and in contrast, external variables possessed more of negative standardised coefficient beta value (-0.468). The results presented correspond to the finding made by Ktoridou, Zarpetea, & Yiangou (2002) show that generally most young, beginner teachers' attitudes toward technology in the classroom were that of their willingness to integrate technological tool during teaching than very experienced teachers. The results indicated that teachers who have taught for more than five years used less technology in the classroom as compared to teachers who have taught less than five years who used more technology in the classroom.

Table 3. Hierarchical regression of level of intentions

	Predictor	Beta	*p*-value
Step 1	$R^2 = 0.449$, $\Delta R^2 = 0.438$, Sig. = 0.000		
	Perception or attitude	0.439	0.000
	Lack of teachers' competency	-0.138	0.020
	Lack of confidence (knowledge and skills)	-0.395	0.000
	Lack of effective training	0.417	0.000
Step 2	$R^2 = 0.846$, $\Delta R^2 = 0.838$, Sig. = 0.000		
	Perception or attitude	0.717	0.000
	Lack of teachers' competency	-0.045	0.263
	Lack of confidence (knowledge and skills)	-0.193	0.000
	Lack of effective training	0.571	0.000
	Limited accessibility	-0.152	0.000
	limited technical support for teachers	0.227	0.000
	Environmental limitation	0.192	0.000
	Lack of access to the internet connection	-0.345	0.000
	Lack of time	-0.468	0.000

4.4 Teachers perception based on the participant teaching experience

Table 4 is the descriptive statistics for the use of technology in the classroom. Table 4 description is analysed based on the classification according to the teacher's years they have

taught in the classroom environment. The classification (in years) is as follows 0 – 1, 2 – 3, 4 – 5 and those with more than five years of teaching.

Table 4. Descriptive analysis for the use of technology in the classroom based on teaching experience

Use of technology in the classroom	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0 - 1 year	49	43.735	3.973	0.568	42.594	44.876	39.000	48.000
2 - 3 years	58	45.310	4.835	0.635	44.039	46.582	39.000	53.000
4 - 5 years	65	43.246	7.425	0.921	41.406	45.086	31.000	52.000
5 and above	28	36.857	1.008	0.190	36.466	37.248	36.000	38.000
Total	200	43.070	5.948	0.421	42.241	43.899	31.000	53.000

Table 5 presents the results conducted to compare the teachers work experience (years) relative to the use of technology in the classroom. For teachers with experiences less than a year (≤ 1) compare to those with teaching experience more than a year (>1), such as the ranges 2 – 3, 4 – 5 and those with more than five years of teaching from the analysis reveals some trend as to whether it is significant or insignificant. The relation between 0 – 1 and 2 – 3 have significance or p-value of 0.516 with absolute mean difference value of 1.576, and for comparing 0 – 1 with 4 – 5 years the significance value is reported as 0.000 and absolute mean difference value as 6.877. In comparing teachers with teaching experience 0 – 1 is with teachers having more than five years of teaching, it was noticed to be significant and also had relatively high absolute mean difference values.

A comparison between 2 – 3 with other years of teaching experience range (0 – 1 and 4 – 5) based on the analysis, it could be noticed that it was relatively insignificant while a relating 2 – 3 with teachers with experience in teaching exceeding five years were significant as shown in table 5. Furthermore, the statistical analysis also reveals that the absolute mean difference between 2 – 3 and the other forms of teaching two experience range (0 – 1 and 4 – 5) were minimal in contrast with comparing 2 – 3 and those more than five classroom experience had higher values.

A similar trend can be said to be observed from the figures of merits presented in table 5 for (4 – 5) compared to 0 – 1, 2 – 3, and those with more than five years. Comparison between (4- 5) with (0 – 1 and 2 – 3) from the values shown in table 5 was insignificant with a very low mean difference; however the same cannot be said for the comparing 4 – 5 years with those having more than five years teaching experience had substantial mean difference value and also significant value far below 0.05 level.

A confirmation of the results already presented in table 5 above is further demonstrated with the trend when teachers with more than five years teaching experience compared to the others teaching years (0 – 1, 2 – 3 and 4 – 5). It is noticed that from the analysis in Table 5 that the comparison between teaching exceeding five years with those below five years was very significant since all the values were far below the 0.05 level. In summary, from Table 5 and based on the figures of merits, teaching experience plays an essential role with regards to the use of technology in the classroom.

Table 5. Multiple Comparisons for teaching experience to the use of technology in the classroom.

Dependent Variable:		Use of technology in the classroom			95% Confidence Interval	
Teaching experience (years)		Mean Diff.	Std. Error	Sig.	Lower Bound	Upper Bound
0 - 1 year	2 - 3 years	-1.576	1.041	0.516	-4.512	1.361
	4 - 5 years	0.489	1.015	0.972	-2.375	3.352
	5 and above	6,877*	1.271	0.000	3.292	10.463
2 - 3 years	0 - 1 year	1.576	1.041	0.516	-1.361	4.512
	4 - 5 years	2.064	0.969	0.213	-0.669	4.798
	5 and above	8,453*	1.235	0.000	4.970	11.936
4 - 5 years	0 - 1 year	-0.489	1.015	0.972	-3.352	2.375
	2 - 3 years	-2.064	0.969	0.213	-4.798	0.669
	5 and above	6,389*	1.213	0.000	2.968	9.810
5 and above	0 - 1 year	-6,877*	1.271	0.000	-10.463	-3.292
	2 - 3 years	-8,453*	1.235	0.000	-11.936	-4.970
	4 - 5 years	-6,389*	1.213	0.000	-9.810	-2.968

***. The mean difference is significant at the 0.05 level.**

5 DISCUSSION

The structure for this section discusses the results generally based on the main research questions used for this study and backed with some previous work done by some researchers in this field.

5.1 What attitudes or perceptions do teachers exhibit about use of technology in the classroom?

Perception, according to (Boulton,1997) can be described as attitudes, self-beliefs, behaviors and opinion that an individual developed towards anything. Based on Boulton's description of perception and relating to the scope of this study, teachers' perceptions could be referred to as the attitudes, behaviors, self-beliefs, opinions or views and the understanding of what teachers have concerning the application of technology in a learning environment such as in the classroom. Teachers' perceptions could also explain the beliefs/views that teachers have about the relevance of integrating technology into teaching and learning.

In this study, the results show a similar trend from previous studies as indicated from the responses collected from teachers. Researchers from previous studies about teachers' perception about the use of technology in the classroom showed that teachers are usually motivated to use a technology provided they have previous knowledge on technology usage and its application in a teaching and learning environment. Early research indicated that the use of technology-facilitated pupils' performance in the classroom (Aminu & Samah 2019, Jatileni & Jatileni (2018) Sanchez, Marcos, Gonzalez & Guanlin 2012).

The research question concerning what attitudes or perceptions teachers exhibit about the use of technology in the classroom were obtained from nine questionnaires (Q1 – Q9). To simplify the quantitative analysis in this discussion section, the responses obtained from the respondents using the questionnaire were further grouped into three, positive, neutral, and negative perception or attitudes towards the use of technology in the classroom. The positive attitudes or perceptions were for those who selected either totally agrees and agree with the options provided in the questionnaire. The selection of totally disagrees or disagree with the questionnaire was classified as a negative perception or attitudes expressed by the respondents (teachers).

The results obtained from the quantitative analysis demonstrated that majority of the respondents (teachers) based on the questionnaires had positive opinion towards using technology to enhanced teaching and learning activities in the classroom, Over 50% respondents were in support or had an attitude that the use of technology could be a useful tool and could possibly enhance teaching and learning, consequently facilitating the pupil's performance. Additionally, the teachers showed positive perceptions based on the quantitative analysis towards the merits associated with the use of technology in the classroom. Therefore, it can be interpreted that teachers' perceptions using technology based on their opinions/beliefs, including their self-efficacy on technology usage into teaching and learning were very impressive.

The study reveals from the quantitative analysis that the teachers generally disapprove based on their perception towards the questionnaires that seek to suggest that the use of technology in the classroom could potentially have adverse effects for teaching and learning. Questionnaires (Q3, Q5 and Q9) were those designed to present a negative option for this particular research question (what attitudes or perception teachers exhibit about the use of technology in the classroom). For example, the questionnaire (Q9) was structured as *I can still have an effective teaching without the use of technology* to know the respondent's perception of how teaching without technology output could be assessed. The respondents who held a neutral position regarding the questionnaire (Q1 – Q9) seeking to examine teachers' attitudes or perceptions do teachers exhibit about the use of technology in the classroom percentage contribution based on the analysis is relatively significant.

The study further shows that the questionnaire (Q1 – Q9) can further be grouped into subsections and discuss to better understand the respondents (teachers) perception or attitude exhibited about the use of technology. These are:

i) Using technology as a teaching tool (Q2, Q8 and Q9)
ii) The potential negative influence (effect) in using technology (Q3 and Q5).
iii) The pupil's performance as result of using technology, (Q1, Q4 and Q6).
iv) Using technology as a source of communication (Q7).

The teachers' perception or attitude exhibited with regards to how the role of technology in contributing to enhance their teaching and learning process, such as Q2 –' *the use of technology makes teaching and learning easier*' and (Q8) –' *I think the use of technology im-*

proves the quality of teaching' shows that respondents or the teachers had positive perception toward these questionnaires (Q2 and Q8). Additionally, in group i, majority of the respondents also expressed their disapproval to Q9 (*I can still have an effective teaching without the use of technology*). Therefore, the trend identified in this research shows that respondents generally had a positive attitude or perception of the use of technology as a tool in their teaching process. For group ii) the results for the questionnaire (Q3 and Q5), indicate that the teachers had relatively a divided opinion concerning the potential negative influence as a result of using technology. This is because neither more than 50 % of the total respondent either shared the opinion of agreeing or disagreeing to Q3 and questionnaires in group ii. The evaluation based on the perception shown by the teachers concerning pupil's performance through the use of technology in the classroom demonstrated generally favorable responses. The analysis points conducted on Q1, Q4 and Q6 shows that the majority of the teachers exhibit a positive attitude with regards to technology enhancing their pupils' performance. Q4 and Q6 could be used to illustrate this pattern that had over 50% of the respondent in support of the questionnaires based on the choices and the analysis carried out.

Teachers perception concerning computer-supported collaborative learning (CSCL) was also sought for from the respondents through Q1 - *The use of technology does not facilitate students in collaborative learning*. The analysis revealed that approximately close to half (45 %) of responses were not in favor (totally disagree and disagree) to the suggestion that technological tools such as computers do not enhance collaborative learning. The teachers whose perceptions are in support of collaborative learning enhanced with computers (opposing to Q1) could be attributable to the respondent understanding of the concept and benefits of CL as explained by Marjan Laal and Seyed Mohammad Ghodsi, 2012. The findings from this study could be related to other researchers work conducted to demonstrate the use of computer-supported collaborative learning (CSCL) as essential to classroom learning (Lambert & Cuper, 2008). It is important to note that the combined opinion (either' totally agree and agree) was reported to have up to 34% of the responses. The respondent (teachers) whose perceptions were in favor to Q1 could be associated or attributed to the constraints resulting from the availability of enough ICT facilities that could assist in collaborative learning, and/or the teachers not having a better understanding of the concept of collaborative learning or computer-supported collaborative learning. The challenges suggested by Lasse Lipponen (1999) concerning CL, such as lack of collaborative skills as well as the ICT implementation challenges shown by Gebremedhin and Fenta (2015) can be related to the findings made in

this study. Furthermore, the analysis also gave a positive indication that the use of social media platform from their response demonstrated as a source of communication. The perceptions gather from the teacher for Q7 shows this pattern.

5.2 Type of technology, and how is the technology used in the classroom by teachers?

In previous studies about teachers' perception about the use of technology in the classroom on the types of technology used, the results indicated according (Capaldo, Flanagan & Littrell, 2008). The type of technology used in basic classrooms suggests that teachers utilise educational software, some of which include drill and practice. Comparing this study with my current indicated that the type of technology used was different based on qualitative analysis.

Another result obtained from this research question showed that the use of software programs is the most available technological application in the classroom. The text, images online and graphs were found to be the second-highest application with regards to the types of technology in the classroom and with the third-highest being the use of computers and laptops. The reason for this trend from respondents could be because of its easy availability.

The role of teachers on how technology is used in the classroom cannot be underestimated since they are major stakeholders in the teaching and learning process or activities. According to Zhao and Frank (2003), teachers' ideas, their experiences, and technological skills can influence technology integration into the school. In this research question (*Type of technology, and how is the technology used in the classroom by teachers?*), 13 questionnaires (Q10 – Q22) based on the quantitative data, examine the teacher's opinion analysed to determine if a positive and negative response will be obtained based on the research question. The surveys for these research questions for analysis demonstrated that the majority of the respondents had a positive idea or knowledge on how to use technology in the classroom by totally agreeing or agreeing to the questionnaire.

The remaining respondents who had negative (totally disagreeing or disagreeing) opinion could be attributed to the teachers less experience or potentially luck of ICT facilities in their schools as indicated by (Ertmer, Ottenbreit-Leftwich and York, 2006), and (Butler and Selbom 2002) which show that reasons that could prevent teachers from using technology

in the classroom can be a result of limited access to hardware, quality software, reliable internet connectivity, technical support, as well as administrative and peer support.

The research question on how is a technology used in the classroom can further classify the questionnaire as; technological hardware availability and usage (Q10, Q12 and Q14), software usage (Q11, Q19 Q20 and Q22), online application (Q13, Q17 and Q18) and finally use in preparing teaching materials (Q15, Q16 and Q21) to bring clarity to the discussion.

According to the responses from teachers, the use of hardware components such as computers, laptops, whiteboards and projectors, indicated that ICT equipment could facilitate their work in teaching and learning. This collaborates with another study carried out by Ghavifekr and Rosdy (2015), indicated that teachers usually used a desktop computer, laptop, system unit, keyboard, mouse, smart boards and digital cameras for teaching and learning in the classroom which had similar results to my current study. Based on the quantitative analysis, more than half of the teachers share the opinion in either totally agreeing or agreeing to the questionnaires (Q10, Q12 and Q14). Similarly, the use of software also obtained favorable responses from the teachers in terms of the usage of types of technology in the classroom, (Q11, Q19 Q20 and Q22). Besides the majority of the respondents demonstrated the online utilization application would enhance the teacher's ability to adequately prepare teaching materials that can improve upon their role played in the classroom environment. For questionnaire Q11- I use software programs like spreadsheet and word program and questionnaire Q22 - I use a spreadsheet to plot graphs support the suggestion that based on the analysis carried out, teachers are in favor or support this component of ICT to enhance their performance as teachers in the classroom. based on the questionnaire (Q13, Q17 and Q18)

5.3 What factors affect the use of technology?

Challenges associated with limited prospects for the teacher to enhance their professional development in ICT, as well as limited resources for both hardware and software, could affect the implementation of technology in the classroom and to some extent the perception concerning the use of technology for teaching and learning purposes (Guttentag & Eilers,2004 Lonergan, 2001). The hierarchical regression analysis investigated or used two categories of the independent variable to discuss what factor affect the use of technology. The variables are:

- teachers' attitude or perception

- teachers attitude and external factors.

The results obtained from the analysis revealed that the respondents had a very positive impression on the use of technology in the classroom. Therefore, it gives an excellent indication that teachers will generally be interested in using technology in the classroom. However, the study also shows that primary schools who lack confidence resulting from the deficiency in, knowledge and skills, as well as competency, will have a negative influence on the ability to use technology in the classroom. Hew and Brush (2007) indicate that there are barriers to using technology in the classrooms which are associated with a lack of teacher technological skill, attitudes, beliefs.

Also, some level of difficulty limiting the effective use of technology is attributed to the kind of technical support by institutions or the main stakeholder in education, such as availability of resources for schools and teachers to use. Butler and Selbom (2002) also emphasised that reliability is a major contributing factor for poor patronisation of technology in the classrooms. Reliability has to do with the availability of hardware, incompatible software between home and school, slow internet connectivity and out-moded software. Therefore, to improve upon the general perception of teachers, factors such as the supply of technological tools that enhances and motivate the teacher to perform well in the classroom should be taken into consideration.

Independent variables such as lack of time, limited or no access to the internet, limited accessibility was considered as external factors that were also noted to have an effect on the use of technology in the classroom and the main stakeholders (teachers). The hierarchical regression analysis showed negative standardised coefficient beta value. These results share the same view with (Ertmer, Ottenbreit-Leftwich & York, 2006), (Butler & Selbom 2002) and (Ramnarain, 2016) which suggested teachers may not use technology effectively during teaching and learning as results other external factors such as lack of time, limited or no access to the internet, limited accessibility or outmoded facilities, inadequate support for ICT facilities and lack of adequate training. It, therefore, demonstrates that these variables suggest teachers could be motivated to implement technology in the classroom will improve significantly if challenges such as limited access to the internet, or limited accessibility are well managed.

5.4 Perceptions teachers exhibit about use of technology in the classroom based on their teaching experience.

Based on the comparative studies concerning the use of technology in the classroom according to the number of years of teaching reveals outstanding finding. The results from the analysis can be discussed as the respondents (teachers) for with less teaching experience were most luckily or probably willing to use technology in the classroom. The finding in this study collaborates very well with investigations carried out by Koh & Frick, 2009, Paraskev et al., 2007) concerning the attitude of less experience or younger teachers toward the use of technological tools in the classroom.

Further attribution for the results from the study can be as a result of the less experienced teachers having exposed to information communication technology during their education prior to becoming teachers. For instance, the younger generation teachers can use ICT supported tools during their studies. The positive perception concerning the use of technology in the classroom for the less experienced teachers can also be accounted for due to the restructuring of educational curriculum for training teachers had also contributed to improving upon the teachers' interest to introduce technological tools in the classroom such smart learning and online platforms of teaching and learning. This observation attributable to less experienced teachers could be related to the suggestion made by Sang, Valcke, van Braak, & Tondeur, 2010, p. 103) where there encourage student teachers to introduce information and communication technology (ICT) into the future profession of teaching and learning in the classroom.

In contrast, most experienced teachers are very much use to using conventional teaching methods in the classroom. This factor associated with the experienced teachers could be dues to the familiarity with the traditional teaching style they have used over the years and most importantly, limited access to upgrade themselves in the field ICT. Paraskev et al., 2007, has shown that teachers possessing computer self-efficacy play a vital role and can influence the ability or output for them to develop essential technologies as educational tools for their profession and subsequently for adapting to the use of technology in the classroom. Additionally, the view concerning computer self-efficacy on the part of the teachers improves upon classroom technology integration is further supported by Koh and Frick, 2009.

Consequently, to assist and close the gap between experienced and less experienced relative to the use of technology in the classroom, much attention should be given to enhancing the

teachers' motivations and self-efficacy on the use of technology in the classroom will be to provide in-service training and the availability of the ICT tools. These will significantly help improve their perception of the use of technology in the classroom, especially for experienced teachers by improving on accessibility to technology thereby making them feel more comfortable to use technology in their classrooms (Miranda, 2007).

6 CONCLUSIONS

The growing need for the use of technology in the classroom for teaching and learning purposes is considered to be to improve and facilitate imparting knowledge. However, it should be noted that the use of technology cannot be totally used as a replacement for the role teachers play in the teaching and learning activities in the classroom but forms a combined effort toward the efficiency and effectiveness in the educational sector. Consequently, since teachers are one of the main stakeholders in the context of the implementation of technology in the classroom, it very essential seek for their perceptions or attitude towards the use of technology in the classroom environment.

The research questions presented in chapter 3 of this thesis were responded by using a self-administered questionnaire. The self-administered questionnaire was employed to obtain information concerning teachers' perception on the use of technology in the classroom in terms of teaching and learning purposes is some basic school in some selected regions of Ghana. The results from the data analysis generally demonstrate that the basic school teachers had a positive perception of the use of technology in the classroom for teaching and learning purposes. Notwithstanding some challenges that affect the integration of technology for classroom activities from the research, teachers have shown interest and demonstrated their commitment to using the technological tools provided there available to be used for teaching and learning. Based on the findings obtained from this research, the following conclusions for this study can be made:

- The basic school teachers generally exhibited positive perceptions towards the use of technology in the classroom. They agree with the suggestion that those technologies are potentially very good tools that boost teaching and learning activities in the classroom in many ways, such as pupil's performance. Most of the participants agreed to the suggestion that the use of technology was less destructive in basic school classrooms based on the perception or attitude identified in this study when the adverse effect of the technology is used in the classroom.
- The limited effect accessibility, outmoded facilities, inadequate support for ICT facilities and lack of adequate training from the study based on the teachers (respondent) perception or attitude also reveals that they generally agree as an essential factor or that could affect or the implementation technologies in the classroom.

- The study further shows that teachers with varying teaching experiences with regards to their perceptions or attitude towards the use of technology in the basic school classroom. Comparative analysis from the research reveals that teachers with less experience had a more positive attitude toward the use of technology in the classroom in contrast to the very experienced teachers. These observations based on the study and other research work done by others (Zaranis, 2013 and Sivropoulou's 2009), which shows that shows that relatively younger, less experienced teachers have more interest in learning how to use technology because they seem to be more familiar compared with experienced teachers who may feel uncomfortable or frustrated by the new technology attributable to the duration to learn and use it in a classroom environment.

The results of this research support the opinion that most basic schools' teachers feel very optimistic and confident when applying in the classroom. Improvement of positive perceptions from the teachers in this study collaborates very well with previous research studies by (Kalogiannakis 2010; Wedman and Diggs 2001; Kankaanranta, 2003, Wheeler 2000; Chen and Chan, 2006) that illustrates how building up the teachers capacity through effective use of ICT training programs for them. Consequently, in conclusion, based on this research it is possible to observe that basic school teachers are generally optimistic and positive perception towards the use of technology and relatively the willing to the implement and use technology to enhance teaching and learning in the classrooms.

6.1 Recommendations and future research

The following recommendation can be suggested for future consideration based on this study:

A potential issue concerning the negative effect of teachers' perception towards the use of technology in the classroom results from limited or the use of lack of training and less teachers' motivation. To mitigate these challenges and improve upon the teacher's perceptions, it is recommended for equitable distribution of ICT devices, reliable and electricity supply to schools. The implementation of regular workshops or seminars organized by the main stakeholder or policymakers in education such as Ghana Education Service, GES and other non-governmental organization with interest in education linked to ICT for teachers should be

encouraged. This is essential for experienced teachers whose self-efficacy in ICT is relatively low and needs to be improved.

For future research studies based on the findings from this study and previous research works, I will suggest the following should be considered to further understand the perception of teachers and general introduction of ICT in the classroom. Particularly for developing countries such as Ghana where the education ministry continues to implement technology to transform the educational system. The suggestions are as follows:

Firstly, a comparative study between teachers in rural schools and town or city schools' perceptions towards the use of technology in the classroom. This will assist in addressing and designing a specific program that enhances the introduction of technology in basic school effectively. Most rural schools lack necessary basic facilities such as electricity and internet connections to their schools compared to most basic schools in the town and cities in Ghana.

Secondly, studies concerning teachers and pupils' perceptions with regards to the integration of computer-supported collaborative learning (CSCL) in basic school. Collaborative learning, CL are generally used in basic school; however, an enhanced approach uses such as computer-supported collaborative learning (CSCL) may pose its challenges. Therefore, research to understand teachers and pupil's perspective with the use CSCL will enhance in identifying the challenges and structure for better CSCL approach.

Finally, a comparative study about teachers' perceptions on the use of technology in the classroom between basic schools (primary and junior high school) and secondary schools (senior high school and technical and vocational school) in Ghana. This could assist in examining the gap relative to the use of technology for these stages of education in Ghana.

7 EVALUATION

7.1 Limitation of the study

The study is envisaged or was confronted with permission issues before the data collection day. Thus, getting the schools' permission to conduct the study will be difficult since the schools have tight academic schedules for the day. In mitigating this potential challenge, an introductory letter will be sought from the Ghana Education Service, which will be used as a permission letter for the selected schools. Furthermore, the tight schedules of the teachers will be a significant limitation; hence, teachers will be contacted only during their less busy periods on the day of data collection

The scope of this study was limited to basic school teachers in four main regions of Ghana. Consequently, the results of this research cannot be fully used generalize as the data for the remaining 12 other Regions concerning the teachers concerning the use of technology in the classroom. Nevertheless, the findings from the study provide very relevant information for policymaker and stakeholders of education sector towards the effective implementation of technology in the classroom. Since the sample population was generally across Ghana, splitting Ghana into two main sectors (northern and southern), each sector had two regions used for this study.

7.2 Validity and reliability

The use of a valid, reliable, and objective interpretation of the results was carefully evaluated and considered for this study, according to Lewis, 2009. For the purpose of this study, the researcher described all the steps carefully starting from data collection, analysis of the results and discussion resulting from the data analysis and presented it as transparent as possible, for the purpose of clarity.

The validity, according to Lewis, 2009, is described as the truthfulness of the research study conducted. The relation between the data collection procedure, data analysis techniques and how the research questions were structured corresponded well with the aim of this study. The sample was obtained from basic school teachers from selected regions in Ghana and based on the structured questionnaire for this research, as it was found to be the most suitable techniques for gathering a good number of participants (teachers). Additionally, the Likert-

scale questionnaire was used to provide a good compilation of clear answers for this research.

The presentations made for the results, discussion and conclusions were shown to correspond to previous studies conducted by other researchers presented in the theoretical framework section.

7.3 Ethical issues

Ethical concerns were carefully taken into consideration throughout this study. During the data collection process, all the participants had an explanation with regards to the topic, the purpose of this research study and research methods to be employed. The researcher ensured that all the participants for this study agreed and gave their consents before responding to the questionnaire. A Likert-type response scale printed out was used for completing the questionnaire.

To further ensure privacy and confidentiality of the participants involved in this study, the questionnaires were collected and presented in this research were anonymous, implying that; no names or personal information such the name of the participant school, gender or age collected were presented in this thesis. Furthermore, it was ensured that deception was not used during the research process and that the data gathered were presented as obtained from the participant. For data analysis were considerable carefully conducted and detailed description presented. Consequently, the conclusion has reported the outcomes for this study were presented accurately.

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APPENDIX

NOTE. This research is being conducted as part of Learning, education and technology (LET) master's studies program at the University of Oulu, Finland. The aim is to get a deeper understanding of teacher's attitude, how they use technology and the challenges they encounter. **Any information provided by respondents shall be confidential as such**.

SECTION A

Name of school: …….....

…….

……..

Highest academic qualification:……

Teaching experience (years), please mark box applicable				
Years	0 – 1	2 – 3	4 – 5	5 and above
Mark here				

Current skills and ability to handle technology in teaching.				
Skills	No experience	Beginner	Intermediate	Advance
Mark here				

Please, explain why you selected any of the options (*No experience, Beginner, Intermediate and Advance*)

……

……

……

SECTION B

Extrinsic factors

	Limited accessibility	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
1	My school has adequate computers or laptops.					
2	My school computers or laptops are outdated and need repairs.					
3	Computers are new and do not break down easily					
4	Do you have a computer laboratory at your school?					
5	My school do not have computers, whiteboard and projector at all.					

	limited technical support for teachers	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
6	Do you get technical support for school computers?					
7	We get technical support any time there is the need.					
8	My school do not get any technical support?					
9	Is technical support inadequate and last minute?					

	Environmental limitation	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
10	My classroom environment is suitable for technology usage.					
11	Whiteboard in my classroom is adequate for lessons projections.					
12	Whiteboard is outmoded and broken and needs repairs.					
13	Classroom size is convenient for teaching technology.					
14	Classroom size makes it difficult to use technology.					

	Lack of effective training	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
15	I have not gained any training in the use of technology.					
16	I have gain adequate training in teaching technology.					
17	The training was not sufficient to enable me to teach technology effectively.					
18	The training was useful so that I can use technology in the classroom.					

19	I went to many training; however, I did not understand how to implement the concept in my classroom.					

	Lack of access to internet connection	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
20	There is an internet connection to almost all the computers within the school.					
21	computers in my school have no internet connection.					
22	Few computers have an internet connection.					
23	It is difficult to get access to the internet because of where my school located.					

Intrinsic factors

	Lack of time	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
24	I spent so much time if I am using technology for teaching.					
25	The school time table is not suitable for technology usage.					
26	I make appropriate use of my time by using technology in teaching.					
27	It is challenging to achieve lesson objective within the given time when using technology.					
28	I have adequate time to use technology in teaching.					

	Lack of confidence (knowledge and skills)	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
29	I am afraid to use technology in the classroom.					
30	I confidently use technology in teaching.					
31	I have adequate knowledge and skills, so I enjoy using technology in teaching.					

	Lack of teachers' competency	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
32	I do not have any interest in using technology in teaching.					
33	It is easier for me to use technology when teaching.					
34	I have the interest to use technology in teaching.					

SECTION C

	How they use technology in the classroom	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
35	I use computers and laptops when planning my lessons.					
36	I create a presentation using video or audio clips.					
37	I email files to teachers and students.					
38	I edit text and images online.					
39	I create text using office word program.					
40	I use a spreadsheet for pupils register and report cards.					
41	I create folders to store my documents.					
42	I download and install software on a computer.					
43	I use a spreadsheet to plug graphs.					

SECTION D

	Teachers perception or attitude	1 (Totally disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5 (Totally agree)
44	The use of technology does not facilitate students in collaborative learning.					
45	The use of technology makes teaching and learning easier.					
46	Technology use in the classroom facilitates collaborative learning.					
47	The use of technology in education makes class distractive.					
48	The use of technology in teaching enhances student's engagement.					
49	The use of technology does not foster students critical thinking.					
50	Technology use in teaching makes students critical thinkers.					
51	The use of technology facilitates the pupil's performance.					
52	Social media, such as WhatsApp makes communication easier among teachers.					

53	I think the use of ICT improves the quality of teaching.					
54	Technology use in teaching do not make students critical thinkers.					
55	I can still have an effective teaching without the use of technology.					
56	The use of technology in teaching do not enhances student's engagement.					
57	I think the use of ICT improves the quality of teaching.					
58	The use of technology facilitates students in collaborative learning.					
59	I think the use of ICT improves the quality of teaching.					
60	The use of technology in teaching enhances student's engagement.					