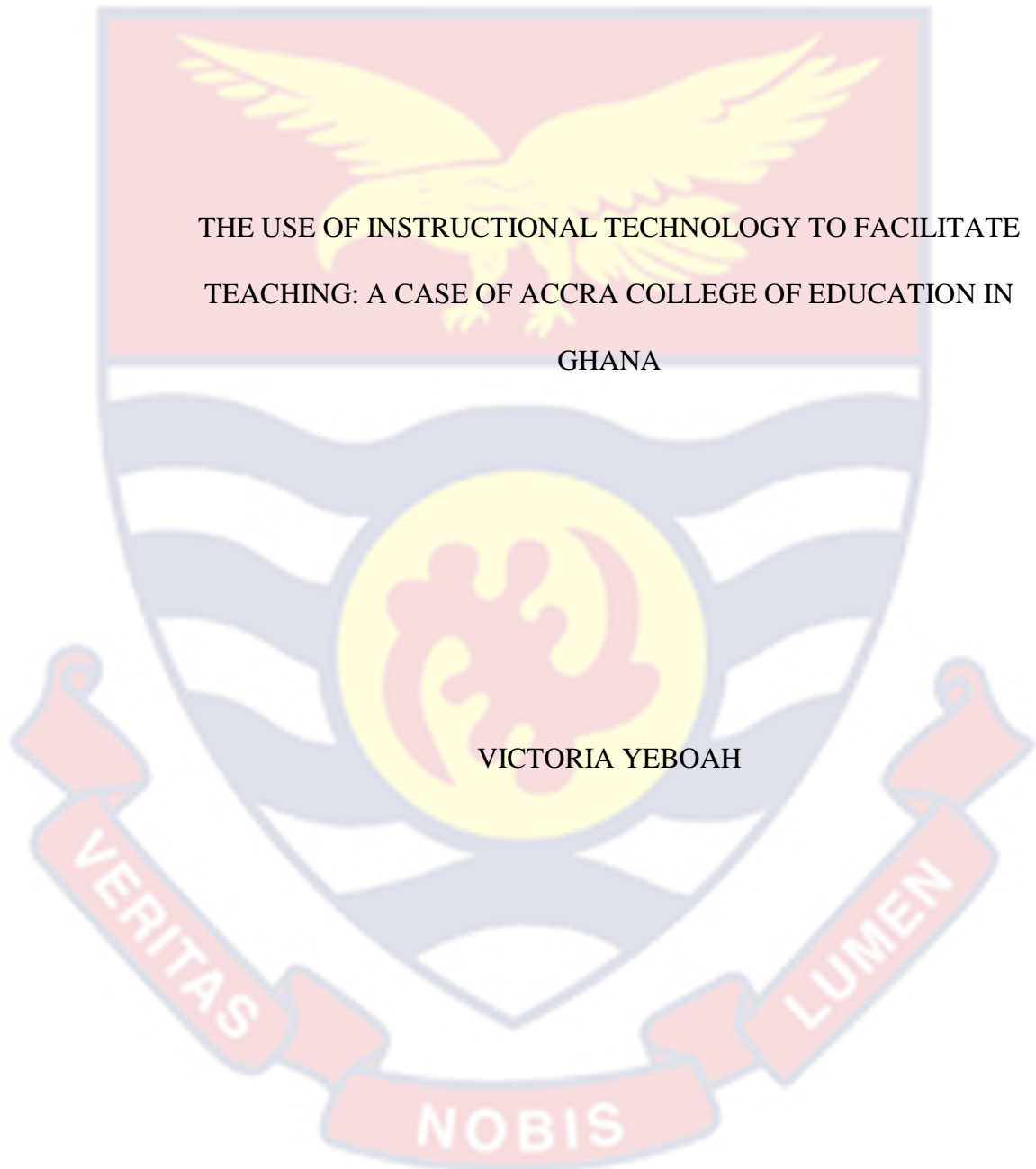


UNIVERSITY OF CAPE COAST



THE USE OF INSTRUCTIONAL TECHNOLOGY TO FACILITATE
TEACHING: A CASE OF ACCRA COLLEGE OF EDUCATION IN
GHANA

VICTORIA YEBOAH

2023



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TEACHING: A CASE OF ACCRA COLLEGE OF EDUCATION IN
GHANA

BY
VICTORIA YEBOAH

Thesis submitted to the Institute for Educational Planning and Administration
of the School of Educational Development and Outreach, University of Cape
Coast, in partial fulfilment of the requirements for the award of Master of
Philosophy degree in Administration in Higher Education

FEBRUARY 2023

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:..... Date:.....

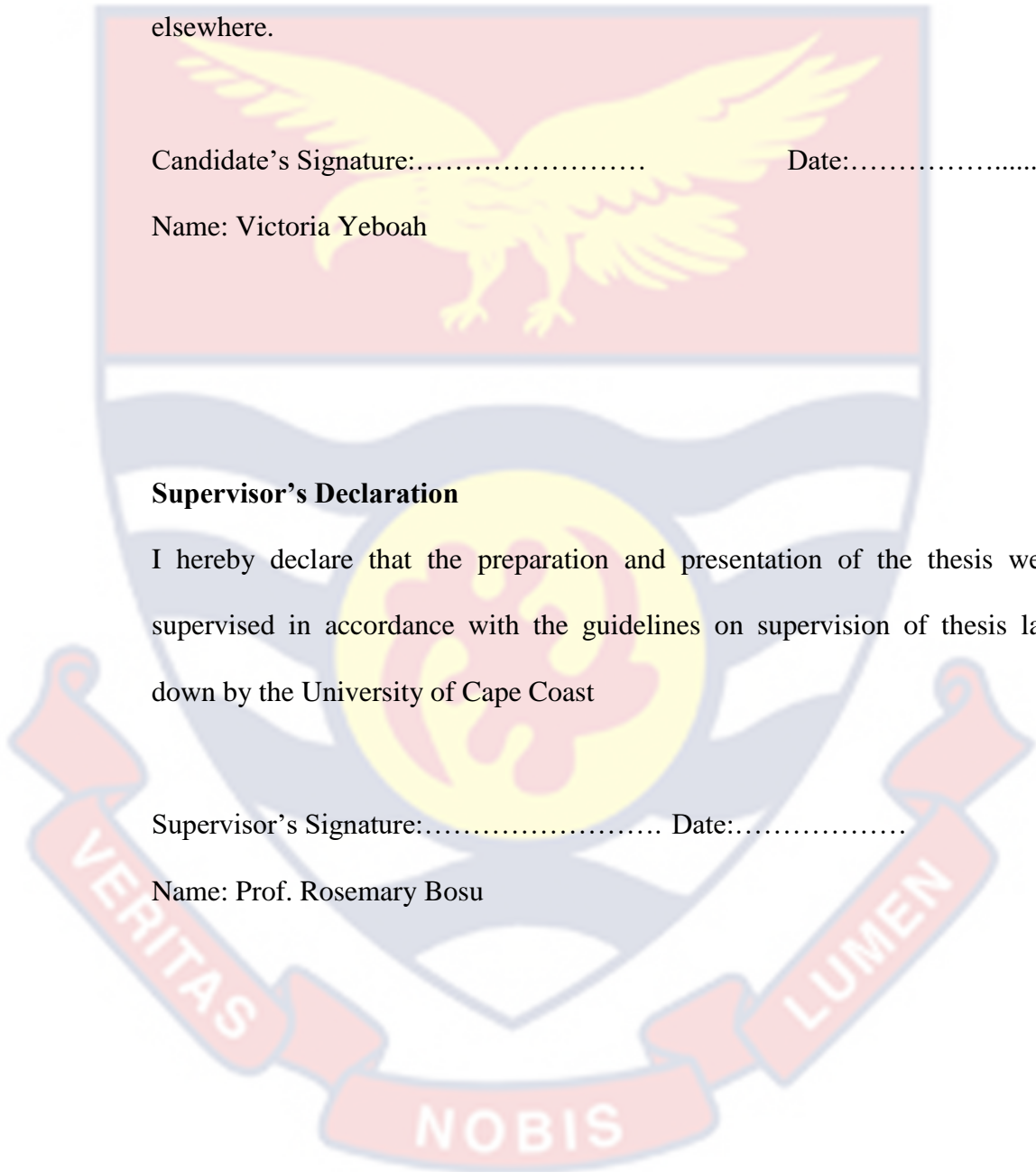
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Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast

Supervisor's Signature:..... Date:.....

Name: Prof. Rosemary Bosu

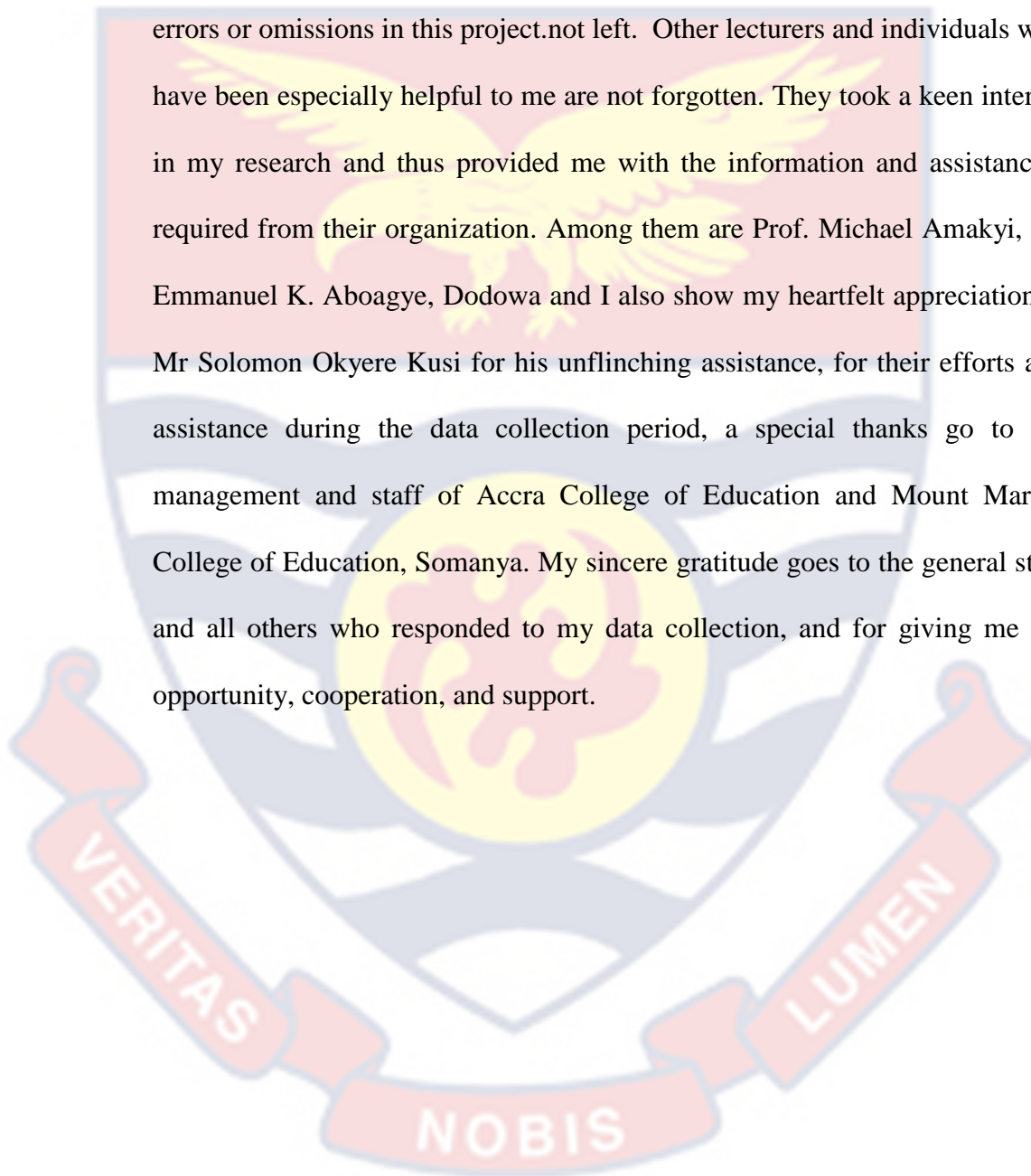


ABSTRACT

In higher education, technology has the ability to fundamentally alter the nature of teaching and learning. Several studies have emphasized the importance of lecturers in higher education using instructional technology in their classrooms. Tutors at Accra College of Education, Ghana, were examined for their use of instructional technology in the classroom. When it came to collecting data, a questionnaire and interview guide were employed. The research has a sample size of 41 participants. The questionnaire was pre-tested and found significantly reliable (alpha reliability of 0.742). The responses, first to the questionnaire were presented in frequencies and percentages and the interview transcribed, categorized and discussed using emerging themes in line with the research questions. A mixed method, quantitative and qualitative paradigm, was employed in this descriptive survey research design. The study revealed that Interactive whiteboards/SMART Boards; Websites and Blogs; internet/Wi-Fi and projectors are the kind of instructional technology mainly used by tutors in teaching. Also, tools such as videos, podcasts, and online quizzes were used to support the flipped classroom teaching strategy. Findings from the study showed that most tutors did not very often use instructional technology in teaching. Further, it was revealed that unreliable electricity supply and network access, inadequate computer peripherals and poor support from school authorities were the main barriers to the successful use of instructional technology by tutors. It is recommended that school authority installs more computers, internet outlets, projectors and screens to cover all lecture rooms.

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DEDICATION

To my husband, children, entire family and friends



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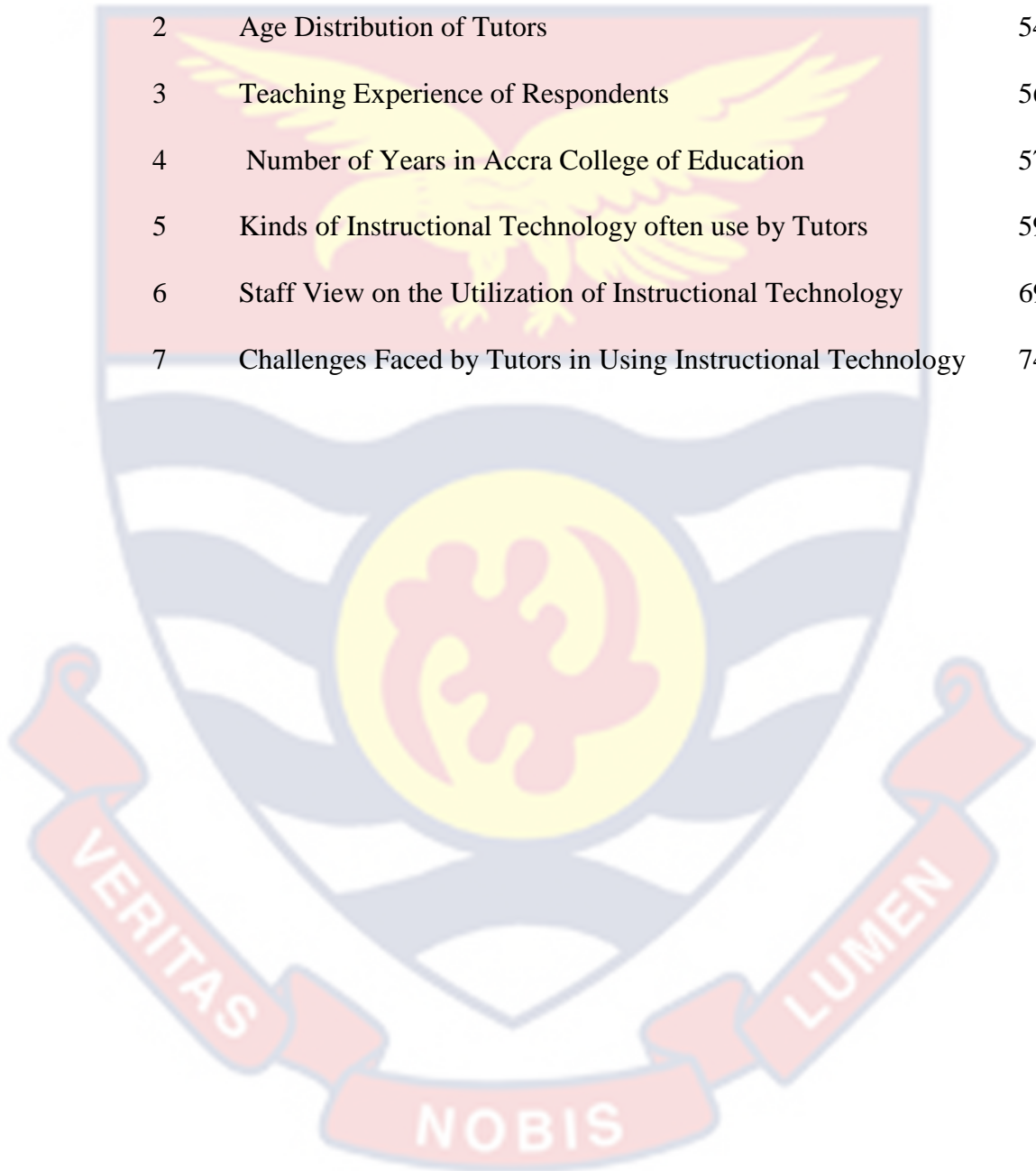
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CHAPTER ONE

INTRODUCTION

Teaching and learning, like many other areas of society is beginning to utilize the increasing and expanding capabilities of technology. Beyond school and the classroom, technology has become an increasingly important part of students' lives. It aids in the understanding of complex concepts or encourages peer collaboration (Thompson, 2013). Teachers have access to a wide range of technology-based resources that may be used both in and out of the classroom to help students learn.

Background to the Study

New instructional technology includes tools for creating course materials, planning and organizational tools for idea mapping and lesson planning, electronic research and reference tools, tools for assisting specific curriculum areas, and tools for recording class lectures and notes (Kurt, 2013). Nations around the globe, with Ghana as no exception, have recognized the fundamental role Information Communication Technology (ICT) is playing in all facets of human endeavour, of which education forms a part (Adarkwa, 2021).

Integrating technology in education plays an important role in helping teachers enhance educational development and increase their technical dexterity. It lessens the uneasiness in lessons preparation and improves delivery. The use of ICT in teaching and learning in Ghana was not common, though a lot of advocacies have gone on in this regard (Antwi et al., 2018). The Ministry in charge of Education in Ghana made some attempts to develop and promote quality education by using instructional software packages and

technologies (Natia & Al-hassan, 2015). In spite of the proliferation of ICT use, it is still common in Ghana to encounter teachers who are unskilled in computer usage. This study investigated the low application of Instructional Technology (IT) to support teaching and learning in public educational institutions in Ghana.

Technology, according to Woodbridge (2004), is an instructional instrument that becomes an instructional strategy when employed in an integrated manner. It is also a mechanism for delivering content to learners, he added. Technology integration can take many forms, from just using laptops to generate document or use specific computer programs to more advanced uses of technology such as developing multimedia projects or broadcasting live online (Woodbridge, 2004). The key to successful technological integration is to remember that the technology is really a tool or a means to a goal, not the lesson's focus (Project Tomorrow, 2012; Thompson, 2013).

Instead of just serving as a means to transport information, new technology should play an active part in the educational process and instructional design. In order to increase educational quality, technology has become an integral part of the teaching and learning process (Hussein, 2011). Teachers may utilize a wide range of resources, both within and outside of the classroom, to help their students learn more effectively (Thompson, 2013). In higher education, as technology advances, there is a rising awareness of the need to integrate technology usage with sound pedagogy (Miller, Glover, Averis, & Door, 2005). In the classroom, instructors employ technology for a wide range of reasons. Some examples include retaining students' attention, streamlining the teaching process, and enhancing student-teacher

communication (Jang & Tsai, 2012). A common belief is that learning is a byproduct of teaching since they are the same thing. A variety of strategies and approaches have been utilized in the classroom to achieve the intended goals and objectives. The use of technology into education is projected to herald a paradigm shift away from conventional methods of delivery, marking the end of the teacher as the exclusive repository of knowledge, given the huge amounts of material accessible on the internet and the global web. Teachers and academic practitioners should no longer consider themselves as knowledge oracles and use the stage to bestow material, information, and wisdom on students whose brains are perceived as empty vessels that need to be filled (Ajayi, 2008). The teaching, research, and service missions of any college or university may be greatly influenced by instructional technology. Use of media-based technology (audio/text/video/image/etc.) to support better communication between educators and targeted learners is known as instructional technology (Jedlicka, Brown, Bunch, & Jaffe, 2002). Teaching is becoming one of the most challenging professions in today's world, where information is advancing at a fast pace and much of it is available to students and instructors alike. Teachers and students are being asked to use new technologies in the teaching and learning process as a consequence of current technological breakthroughs (Kihzoza, 2016).

An alternative is to include instructional technology into the classroom. Teachers in developed nations are embracing technology to the fullest extent possible in order to better themselves and their students' educations as well as their own (Alharbi, & Sandhu, 2017). Students utilize technology to monitor their own progress while completing specific projects on their own time. It's

typical for teachers to work together to find solutions to problems by sharing their own.

Innovation in teaching and learning is spurred by the use of new technology (Kihoza, Zlotnikova, Bada, & Kalegele, 2016). To what extent can we expect to see technology used in our classrooms depends on the level of knowledge and maturity of both students and instructors (Aziengbe, 2017). Technology may be integrated into the teaching and learning process if instructors and students have developed the skills necessary for this purpose. It is possible that instructors and students might work together to help pupils learn via the use of technology in the classroom, changing traditional ideal models of the teacher providing insight and the student remembering information. As the process of transformation progresses, it is important to have a natural source of motivation to persevere. The design of instructional materials is the focus of educational technology. A key component of this discussion is identifying and designing instructional materials related to learning objectives, as well as selecting or developing a strategy to delivering these resources. Some definitions include anything from chalkboards to multimedia, and even procedures and activities like instructional system design are considered instructional technology.

The tools, media, and procedures designed to support the teaching or learning processes are referred to as instructional technology in this study. In a society where information is continually developing and new technologies are requiring instructors to understand how to employ educational technologies in their teaching, teaching has become one of the most difficult occupations. Technology-rich classroom environments are created by the

employment of technological instruments. They can not only display static content, but also assist in the display of dynamic content (Betcher & Lee, 2009).

Despite the fact that technology is an important interactive tool, instructors' attitudes and views of it are still important variables in its effective integration (Smith, Higgins, Wall, & Miller, 2005). Although instructional technology tools can help pupils pay attention, some teachers worry that they will become overworked as a result (Dang, 2011).

There has been a recent uptick in Ghanaian school districts' desire to provide computer education. Many initiatives were in place before the 2007 educational reforms were implemented. NEPAD e-schools, the Global Teenage Project, and the aid of certain former students' organizations were only a few of the initiatives listed. As a result of this educational reform, Ghana's Ministry of Education launched a process of incorporating ICTs into the curriculum at all levels in order to make ICTs relevant in education. We designed a policy framework for Ghana's information and communication technology-accelerated development (ICT4AD) based on recommendations from the National Education Review Committee (Anamuah-Mensah, 2003).

All stages of education should embrace ICT, according to both studies. New educational reforms helped to manage and streamline the use of information and communications technologies (ICTs). To encourage teachers to embrace ICT as a teaching tool, the reform required the construction of computer laboratories and the introduction of computers into all Ghanaian schools. Students are now the focus of the classroom, not the instructor, thanks to the reforms implemented by the government. A number of strategies were

used to train teachers including seminars, workshops and other types of continuous education.

The purpose of these training sessions was to increase instructors' knowledge of and motivation for making changes to their instructional strategies. Although it looks to be completely different in the actual world. A policy framework has been designed by the government of Ghana to increase the use of instructional technology in classrooms. Among other things, Ghana's ICT strategy intends to make use of ICT as a teaching and learning instrument. Student educational options will be expanded by using a distance education strategy. ICT courses and the use of ICT in education are mandatory at all levels of education in Ghana as a result of this. Teacher education and national development objectives may be linked via innovative pedagogical practices, curriculum, and the whole institution. The issue arises as to whether instructors can simply use this new technology to enhance education. Rogers' diffusion of innovation theory may be used to this subject in order to examine instructors' adoption of instructional technology (2003). Accra College of Education (ACE) in Ghana was the focus of this research, which examined the use of instructional technology in the classroom.

Statement of the Problem

Evidence from the Shai-Osudoku Education Directorate indicates that, most trained teachers posted to the District do not often use instructional technology in their teaching inspite of the availability of facilities and tools. Out of a total of 497 newly trained teachers posted to the District between 2013 and 2019, the highest number 106 (21.33%) were graduates of Accra College of Education. Others were from other colleges: Kibi College of

Education 90 (18.12%); Ada College of Education 87 (17.51%); Akropong College of Education 79 (15.89%); Bimbila College of Education 35 (7.04%); Komenda College of Education 30 (6.04%); and Mount Mary College of Education 70 (14.07%) (G.E.S, Dodowa, 2020).

The percentage of these teachers, observed by the headteachers of the various schools, who use instructional technology in teaching over same period ranges from 8% minimum to 40% maximum thus: Accra College of Education 10 (9%); Kibi 7(8%); Ada 11(13%); Akropong 15(19%); Bimbila 9(26%); Komenda 12 (40%); and Mount Mary10 (14%). In all, only 74 (15%) of the total number of 497 new teachers posted are found to use instructional technology in teaching (G.E.S. Dodowa, 2019). These figures indicate the limited number of newly trained teachers (specifically those from Accra College) effectively using instructional technology in their teaching. It is therefore necessary for a study to be conducted to investigate the cause of the low patronage of instructional technology use.

Accra College of Education tutors in Ghana were the subjects of this research, which was aimed to examine how instructional technology was used to teach students at Accra College of Education. This is because it is anticipated that instructors utilize technology in the same proportion as their own teachers. It is assumed there is a correlation between the amount of time teachers spend using technology in the classroom and the amount of time their students spend using technology.

Purpose of the Study

The main goal of this study is to investigate the cause of low application of IT by professionally trained teachers in schools. It would

examine how the tutors at Accra College of Education in Ghana use instructional technology/ICT in their classes and its subsequent impact on the pre-service teachers who complete there and are finally posted to their various stations as trained teachers.

Objectives of the Study

The study has as its main objectives the following:

1. To examine the kind of instructional technology mainly employed by tutors to support the training of pre-service teachers in Accra College of Education,
2. To investigate the instructional technology utilisation patterns of tutors in Accra College of Education, and
3. Identify the challenges associated with using IT by tutors and students in teaching and learning in Accra College of Education.

Research Questions

The following research questions guided the study:

1. What kinds of instructional technology are mainly used by most tutors to support the training of pre-service teachers in Accra College of Education?
2. What are the instructional technology utilisation patterns of tutors in Accra College of Education?
3. What challenges are faced by tutors in using instructional technology to support teaching and learning in Accra College of Education?

Significance of the Study

Accra College of Education's use of instructional technology will be better understood when the outcomes of this study are published. It offers a new perspective on prior findings. The findings of the study, would help school administrators to better understand how much instructional technology has been integrated into the classroom. Also, the findings will inform the government and other stakeholders (interested party) on the hindrances to the use of IT to facilitate teaching, the information will enable the stakeholders identify mechanisms that will ensure successful use of IT to facilitate teaching in public Colleges of Education. Additionally, it would shed light on instructional technology integration areas ripe for additional study in order to inform policy, practice, and future research in the field of educator preparation. As a final point, the findings and recommendations presented will serve as a basis for future research.

Delimitation

The study was carried out solely at the Accra College of Education in Greater Accra Region of Ghana. This may affect the generalization of the findings of the study to other Colleges. The findings therefore cannot be extrapolated to all teacher educators at the Ghanaian Colleges of Education. The scope and boundaries of this research covers the kinds of instructional technology mainly used by most tutors; instructional technology utilisation patterns of tutors and challenges that are faced by tutors in using instructional technology to support teaching.

Limitations

This research had a number of limitations. Data collection had issues. Online interview was chosen and mailed questionnaire because of COVID

19's ongoing worldwide epidemic and observation of its protocols. This, in part, informed the decision to use purposive sampling where only those who were deemed to have the information were approached through gate openers. Finally, the fact that the research was not concerned with making generalizations about the state of integrating technology in teaching in all Colleges of Education in Ghana, an opportunity was missed to come up with findings that would have applied to the entire Colleges.

Also, the descriptive survey research design employed had some challenges. The limitation of the descriptive survey research design is that without control of independent variable variation, the researcher cannot be certain whether the relations between independent and dependent variables are casual or non-casual. That is, a survey may establish that 'A' and 'B' are related, but it is impossible to determine solely from the survey results that A causes B. Causality is difficult to establish because many intervening and extraneous variables are involved. Per the current design, therefore it is difficult to link the use of IT by tutors in teaching at school to the use of IT by the beneficial pre-service teachers when they complete and are finally posted to the field as trained teachers.

Rogers' (2003) adopter classifications based on innovativeness were also not asked about in this study (innovators, early adopters, early majority, late majority and laggards). Tutors' effective use of instructional technology may bring them closer to Rogers' categories of adopters or the other way around. Rogers' descriptions of the adopter types are only partially supported by this study's findings.

Definition of Terms

Educational technology

It is the field of study that investigates the process of analyzing, designing, developing, implementing, and evaluating the instructional environment, learning materials, learners, and the learning process in order to improve teaching and learning.

Instructional technologies

These are teaching and learning tools and devices that employ technology. It encompasses the design, development, use, management, and evaluation of technology in education.

Technology encompasses the use of computers and multimedia for educational and learning objectives.

Instructional technology: The tools, media, and procedures designed to support the teaching or learning processes are referred to as instructional technology.

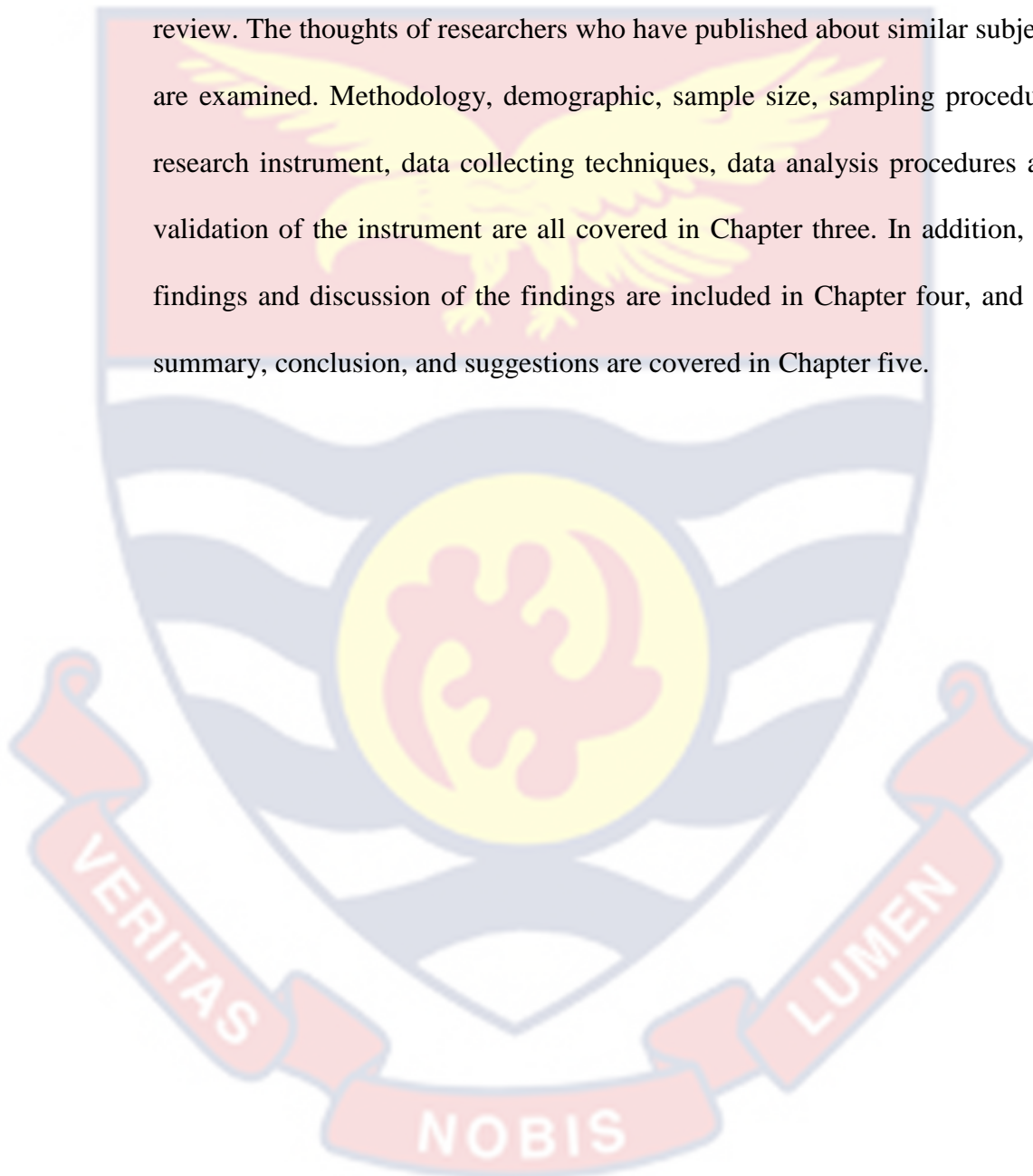
Technology infusion is the involvement of technology-based tools including spreadsheets, multimedia, and telephony to supplement certain teaching activities in the classroom.

Tutors technology use: is the use of computer technology by tutors in the classroom to educate. The usage of popular application software (e.g., Microsoft Word) and curriculum/subject-based applications, the web, and multimedia technologies are included in this category.

Diffusion: is the process through which a new idea gets adopted and accepted by members of a certain group.

Organization of the Study

A total of five major Chapters makes up this research project: Chapter one introduces the study, which contains the problem, the objectives of the investigation, the significance of the study, the research questions, and the delimitation and limitation of the study. Chapter two also includes a literature review. The thoughts of researchers who have published about similar subjects are examined. Methodology, demographic, sample size, sampling procedure, research instrument, data collecting techniques, data analysis procedures and validation of the instrument are all covered in Chapter three. In addition, the findings and discussion of the findings are included in Chapter four, and the summary, conclusion, and suggestions are covered in Chapter five.



CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter evaluates relevant theories, existing research reports, and other related materials. Areas that are covered include the following sub-headings: theoretical foundation; background of Accra College of Education; curriculum of College of Education in Ghana; meaning and scope of instructional technology; types of instructional technologies and their usage by tutors and students; basis for technology usage in Ghana Education system; and challenges in instructional technology usage in teaching.

Theoretical Foundation- Diffusion of Innovation Theory

Several theories and models have tried to explain how technology is adopted, the stages it takes and the traditional role of technology in the classroom setting. This current study shall consider Rogers' Theory of Diffusion of Innovations.

The diffusion of innovations theory describes a process in which an innovation is communicated through certain channels over time among members of a social system (Rogers, 2003). Rogers stated that diffusion is a special type of communication about an idea that might work or not. He argued further that, adoption or rejection of a new ideas lead to a social change- "a process by which alteration and functioning occur in a social system" (p. 6). Rogers used "innovation" and "technology" synonymously. Any diffusion process, according to Rogers, is influenced by four elements: innovation; communication channels, time and a social system.

According to Rogers (1995), diffusion is the process of gaining acceptability by a group of people. It is the process by which an innovation is adopted and gains acceptance by members of a certain community. A number of factors interact to influence the diffusion of an innovation. The four major factors that influence the diffusion process are the innovation itself, how information about the innovation is communicated, time and the nature of the social system into which the innovation is being introduced (Rogers, 1995). Rogers (1995) views innovation dispersion as a social development. Instructional technology is inherently an innovation-based discipline. An instructional technologist who understands the innovation process and theories of innovation diffusion will be more fully prepared to work effectively with potential adopters (Schiffman, 1991). Rogers defines diffusion as “the process by which an invention is disseminated over time among members of a social system” (p. 5). Wolcott (2003) employed Rogers' diffusion of innovation theory to examine complicated trends and patterns of innovation adoption (Wainwright & Waring, 2007). The current study therefore adopts this definition to examine the effectiveness of the use of instructional technology by tutors of Accra College of Education.

Rogers divides adopters into five categories: Early adopters, early majority, late majority, and laggards. Rogers' Theory of Diffusion of Innovation starts with a small number of inventors (Robinson, 2009; Rogers, 2003). In the nutshell, Diffusion of Innovation theory, might be predominantly useful to study the use of instructional technology in teaching by tutors. Therefore, Rogers' diffusion of innovations theory was useful in understanding the pattern of usage of instructional technology in teaching as

well as the technological needs of different adopter categories (thus early adopters, and late adopters). This study therefore found Rogers' (2003) diffusion of innovations useful to the study.

Figure 1 depicts how innovators are classified.

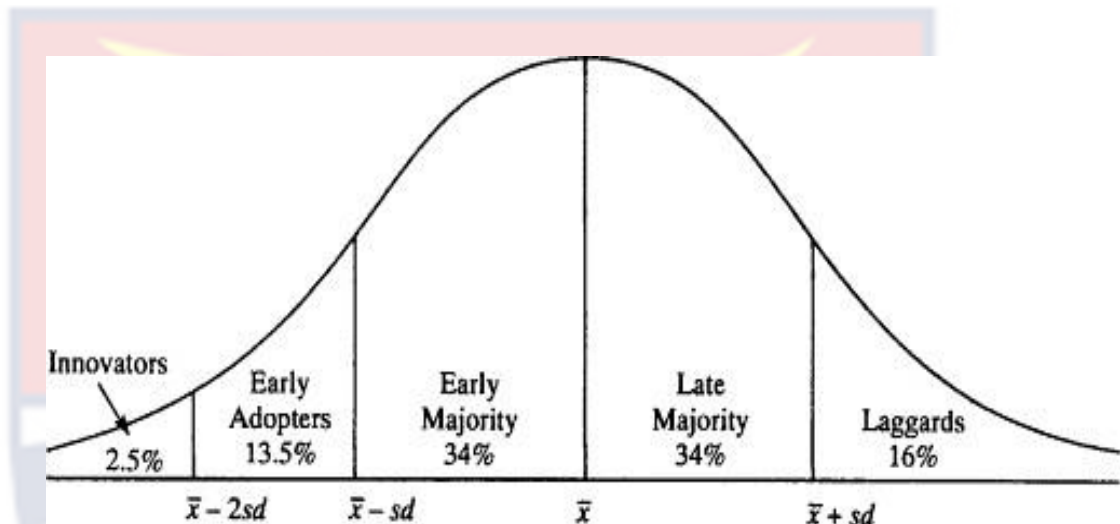


Figure 1: Adopter Categorization (Rogers, 2003, p. 281).

Innovators, early adopters, early majorities, late majorities, and laggards are five distinct sectors of a population. The potential adopter must gather knowledge about the technology, evaluate it, and decide whether it is worth the effort and time required to add it to their skill set (Rogers, 2003).

According to this notion, people's readiness to absorb new ideas varies substantially. Figure 1 shows a normal distribution of innovativeness within a population. About 2.5% of the population are "innovators", individuals who lead the way in embracing new ideas. A population of "Early Adopters" is 13.5 percent. Most people fall into one of two categories: Early Majority (34%), or Late Majority (34%). Around 16% of the population are "laggards", who will delay embracing new technologies. This hypothesis is crucial because it illustrates that a population cannot accept an invention

simultaneously. Change agents should anticipate the concerns of all groups, from innovators to laggards.

People tend to examine new technologies and see how well they operate in their activities before embracing or rejecting them (Rogers, 2003).

This theory aims to explain how a new concept, behavior, or item is embraced by the population. The Diffusion of Innovations Theory provides useful insights into the process of societal transformation (Robinson, 2009). These include the value of peer-to-peer interactions and peer networks, as well as knowing user groups' demands. A diffusion hypothesis based on Rogers' innovation traits theory has been adopted by many others. There are two main types of diffusion theories: general and instructional technology. Farquhar and Surry (1994) classify diffusion theories into two broad categories: general and instructional technology. This evaluation has been arranged according to their taxonomy. Rogers is the most often mentioned author in the field of diffusion theory in general. Most studies of adoption and dissemination are based on Rogers' (1995) theory. In instance, four of Rogers' hypotheses seem to have common aspects in most diffusion theories. Innovator traits and dissemination rates are some of the aspects that are frequently seen together. Innovation's quality, how it is disseminated, and time all have a role in how far it spreads (Rogers, 1995). Perceived characteristics have a role in a person's decision whether or not to accept a new invention, according to this notion. Five traits or features associated with the invention from the inventors' point of view can help spread new innovation, according to Rogers, (2003). These five qualities are:

- i. *Relative advantage:* Rogers (2003) defined relative advantage as “the degree to which an innovation is perceived as being better than the idea it supersedes” (p. 229). The faster an invention is adopted; the more recognized relative worth it has. The perceived relative benefits of an invention are the biggest predictor of adoption. It is the rewards that a person considers while adopting an invention.
- ii. *Compatibility:* Rogers (2003) stated that “compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (p. 15). There are several factors to consider when determining whether or not a new product or service is a good fit for a potential customer base. Innovators who feel that their needs and experiences align with the new innovation are more likely to speed up the adoption process.
- iii. *Complexity/Simplicity and ease of use:* Rogers (2003) defined complexity as “the degree to which an innovation is perceived as relatively difficult to understand and use” (p. 15). Complex innovations, such as those that need the acquisition of new knowledge and skills by the end user, are more difficult to implement.
- iv. *Trialability:* is the degree to which an idea can be tested on a small scale. According to Rogers “trialability is the degree to which an innovation may be experimented with on a limited basis” (p. 16).

- v. *Observable results:* Individuals are more inclined to accept an invention if they can easily see the effects. Rogers (2003) defined observability as “the degree to which the results of an innovation are visible to others” (p. 16).

Uncomplicated innovations that are superior than competitors (or the status quo) are more likely to be accepted. Importantly, the idea of innovation traits underlines that potential adopters' perceptions are critical in the adoption process.

The “S-Curve hypothesis” is another popular notion. According to this hypothesis, a successful innovation grows slowly at first, then rapidly, before plateauing. A graph depicting this pattern of slow growth, rapid expansion, and plateauing would look like the letter S, for obvious reasons. This concept is crucial because it demonstrates that even successful innovations need time to establish momentum and achieve a certain level of popularity. Consequently, change agents should identify and develop enabling services and technologies.

A major goal of the theory is to create a conceptual paradigm or framework for anybody interested in learning more about how innovations spread and transform society. Among the most pressing concerns scholars have attempted to address is why are certain innovations accepted while others are not? When it comes to new technology, why do some instructors and institutions embrace it quickly, while others remain hesitant? In what ways are individuals and organizations affected by the introduction of new technologies? (Wilson, Sherry, Dobrovolny, Batty & Ryder, 2001). A relative advantage, compatibility, complexity, trialability and observability are among

Rogers' (2003) qualities of innovation. Rogers' (2003) five features and characteristics can motivate or demotivate all instructors to employ technology in their classrooms. The review concludes that relative benefits, compatibility, simplicity, trialability, and observability of an invention can account for the level of instructional technology adoption in Ghana.

Background of Accra College of Education (ACE)

In the 20th century, uncertified teachers, teaching in public schools had few facilities at their disposal or available to them to study for the Teacher's Certificate Examinations. As part of their professional training, these pupil teachers were given an hour's instruction daily, by the head teacher of their schools. The instructions were accompanied by some amount of homework. This system of instruction proved very insufficient resulting in the accumulation of a large number of uncertificated teachers in the system, especially in the public sector, Ministry of Education college handbook (2011/2012).

According to the handbook, efforts were made to surmount this unsatisfactory state of affairs and coupled with persistent request from Missionary Societies that have no training colleges on their own, the Colonial Government opened a teacher training college in Accra in 1909. It was called Government Training College with W. H. Baker as the first Principal. It was a non-denominational college and located in the present day-Metro Office Kinbu. The Government Training College was the first institution of its kind established by a British West African Government and it was to become the training centre for the Government as well as the Missions except the Basel Mission which already had Seminaries for training Teachers and Catechists at

Akropong and Abetifi. Students for the Government Training College were drawn from pupil teachers in the system and pupils who have passed the Standard Seven examinations (Ministry of Education college handbook, 2012).

In 1924, the Government established the Achimota College in Accra when teachers were trained for government and some Mission schools. Achimota School/College commenced its educational training programme in 1927. In 1928 students of the Government Training College were transferred to Achimota College at its present location, to start and constitute the Teacher Training Department of Achimota College. The Teacher Training Department at Achimota existed from 1928–1948. In 1948, an ordinance was passed to establish the Teacher Training College/Department shared the Western compound of Achimota school with the newly established University College (Ministry of Education college handbook 2011/2012).

This section/department was relocated to Kumasi in 1951 and became the Teacher Training Department of the newly created College of Arts Science and Technology. The Government Teacher Training College moved from Kumasi to Winneba and shared space with the Advanced Teacher Training College. Winneba's Teacher Training Section was disbanded in 1973. Winneba's surviving students were spread among the country's teacher training institutes. Government Training College was changed to Accra College of Education. In 1962, the S.D.A. Training College in Asokore-Koforidua was also opened.

Founded on November 15, 1962, the New Accra Teacher Training College was located in a private facility in the city of Accra New Town

(Kokomlemle). It was established as a school for the preparation of teachers for the elementary and secondary school grades. At the time of its inception, it had a staff of eight teachers. Kojo Heizel and R. N Gherbic, two of the First staff members who went on to become principals, were notable among the First staff members. Accra Training College's first principal, the late Mr. I. B. Ama-Hesse, served in that role. Students at Kokomlemle can now stay in two different buildings, one for men and one for women, at two separate sites. It's unclear why the female hostel was shut down so early, whereas the male hostel remained open to students until 1988, when the owner obtained it from the college and took it back.

As a 4-year Certificate "A" teacher training college, in 1975-76, the 4-year training program became a three-year post-secondary institution. In the 1980s, the show was revived. A permanent location for the institution was secured near the Institute of Professional Studies (IPS) in Mempeasem in 1974. Many housing complexes were developed, and on January 10, 1985, the College moved from its original location in Kokomlemle to its current location. However, Accra Training College began offering a modular course program in 1987, not in 1984 as originally planned. First, it was a Cluster Class. These students were later enrolled as third year students and spent two years in college to finish the 4-year Certificate "A" programme. As part of the 1987 educational reform programme, Accra Teacher Training College (ATRACO) was categorized as a Group One College.

A total of nineteen (19) students were enrolled at the Accra College of Education when it was first formed in November 1962. In January 1985, the College relocated to its current location at East Legon. Until October 2001, it

was the sole day teacher training college in the country. There are many programs at the college, including the Certificate "A" 4-year Post Middle, the 2-year Modular Post Middle for Pupil Teachers, the Certificate "A" 3-year Post Post-Secondary, and the 3-year Diploma in Basic Education. It comprises six academic divisions and handles the general teacher preparation program. There is a link between the college and the University of Cape Coast in Ghana. At every level of the country's educational institutions, as well as in the civil and public service, the college's graduates may be found in top managerial positions.

Curriculum of the Colleges of Education in Ghana

Since the implementation of the 1961 Education Act in 1961, the curriculum of once teacher training colleges and now Colleges of Education in Ghana has undergone a series of changes. Children as young as 6 years old were required by the 1961 Education Act to receive free, universal, and compulsory basic education (of six years) (Kadingdi, 2004). This allowed Local Authority Councils to administer schools while parents and guardians were required to make a little contribution toward their local schools' operations.

The number of primary schools grew from 1,081 in 1951 to 3,372 in 1952, a quick and consistent increase (Foster, 1965). In the five years from 1951 to 1956, the number of students enrolled in Ghana's schools quadrupled, and the country was hailed as Africa's most developed education system (Foster, 1965; Scadding, 1989). Teachers need a solid foundation in content and professional skills to be effective and efficient in their work with students. They also need to be instilled with leadership qualities to help them integrate

the school into the community. The Dzobo (1974) group outlined four aims for pre-service teacher education: to provide teachers with a firm foundation in material and professional skills that would enable them to be successful and efficient in their work with pupils (p. 34). At the time, the teacher training program was developed to accomplish the aforementioned objectives (Kadingdi, 2004).

As stated by Akyeampong (2001), the pre-service beginning teacher education curriculum for basic education included general education (30%), academic education (30%), and professional studies (40%) as components. Basic arithmetic, English Language, Basic Science, Ghanaian Language, Physical Education, Cultural Studies, Education, and Agricultural Science are all included in the general education. Students in group one or group two choose two optional topics from a list of six, which Akyeampong further reveals. The first group consisted of science-related topics, while the second group was devoted to more practical themes. One group of schools focused in group one, while another concentrated on group two.

1999/2000 saw the introduction of the IN-IN-OUT type. It is currently operationalized and included into the training of teachers in Ghana's educational institutions. Students that follow the IN-IN-OUT model spend their first two years of college studying and their third year working in a school setting to get practical experience. As part of the new teacher education program, students are expected to learn both theoretical and practical skills (Akyeampong, 2001). Unlike the former paradigm, District Assemblies are involved in selecting and financing applicants for teacher training. After training, these sponsored teachers must teach in the district.

There is a component of practice teaching in the approach. There is a school attachment at the conclusion of the first year where student teachers observe normal instructors in the classroom teach. In the second year, students practice lesson design and specialized teaching abilities through on-campus practice teaching. During the third year, students are required to complete a year of field experience teaching in a public school. In the schools where they work, they are coached by experienced instructors (Akyeampong, 2001).

In September 2004, the IN-IN-OUT component of the three-year post-secondary teaching program was upgraded to a three-year Diploma in Basic Education. This measure is designed to guarantee that the country's basic education system provides high-quality education. At the outset, Akyeampong (2001) asserts that the curriculum is semester-based, and Akyeampong posits that the notion of a teacher credential for teacher trainees was established in 1992 as part of the regional colleges of Applied Arts, Science, and Technology institutions initiative.

This curriculum includes two parts: DBE 'A' and DBE 'B'. The DBE program "A" prepares teachers to teach all courses in elementary schools, whereas program "B" prepares teachers to teach two or three subjects in junior high schools.

Meaning and Scope of Instructional Technology

Instructional Technology is a systematic approach to planning, developing, and assessing total and non-human resources (Nunan, 1983). Also, instructional technology is audio-visual communications, which governs the learning process (Kurt, 2017). Message structure and systematization in an educational context. Components and full instructional systems can be

planned, produced, selected, managed, and used. Kurt stated that its practical purpose is to effectively use every method and medium of communication that can help students reach their maximum potential.

Based on research in human learning and communication, instructional technology according to Kurt (2017), is “a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, using a combination of human and non-human resources to achieve more effective instruction” (p. 16). Some definitions of educational technology restrict it to audio-visual aids while others use it synonymously either as instructional technology or technical education. Talabi (2003) regards both terms as interchangeable. Furthermore, he argued, all three viewpoints are accurate, but none is a comprehensive explanation of the concept.

While instructional technology is an aspect of educational technology, according to Talabi (2003), educational technology is an application of the ideas and discoveries of the physical and behavioral sciences in order to plan, create, implement, and evaluate educational systems. Teaching and learning processes are aided by the use of instructional technology, which is a combination of psychology, innovation, and curriculum. It comprises the theoretical and practical elements of managing learning resources, producing teaching aids, and repairing and maintaining teaching materials and equipment. It may be separated into at least three (3) parts: instructional devices, instructional techniques, and instructional approaches.

Instructional devices are "a broad variety of educational materials and gadgets meant to deliver realistic visuals and replacement experience in order

to augment curricular experiences of various sorts" (Talabi, 2003: p. 15). Examples are chalkboards, bulletin boards, graphic devices, television, videotapes and the likes. With instructional technique, it includes the skills of imparting and promoting knowledge through the use of workshops, seminars, symposia, conferences, talks, debates and the likes. Instructional methodology includes all the special ways through which an instructor imparts or inculcates knowledge in the learner. According to Talabi, this could be done through dramatization, field trips, games and the likes.

Benneh (2006) report to UNESCO as cited in Abreh (2010) expressed the commitment of Ghana at integrating educational technology. Benneh (2006) offered six ideas for the Ghana Education Service's Teacher Education Division to integrate technology into the classroom as follows: ICTs can be used to connect pre-service and in-service teacher training by providing pedagogical tools and educational resources; a regional online teacher resource base and an offline network for teacher training institutions can be set up to share ICT's as pedagogical tools and educational resources to connect pre-service and in-service teacher training.

In lieu, it can be concluded from the above review, which gave the meanings of instructional technology and educational technology, that IT is very important for the training of teachers. It can be used to help the pre-service teacher training by providing pedagogical tools (instructional devices, instructional techniques, and instructional approaches) and educational resources.

Types of Instructional Technologies and Their Usage by Tutors and Students

Teaching and learning are the primary goals of instructional technology, which comes in a variety of forms. When it comes to daily learning, classroom technology has become a must-have tool. Incorporating technology into classroom activities, such as group learning and flipped schooling, is now feasible because of advances in technology. Teachers must be inspired to use educational technology in their classes. As part of faculty evaluations, teachers should be required to demonstrate proficiency in the use of technology in the classroom (Whale, 2006).

Students watch brief video lectures at home before class in a flipped education style. Classes include exercises and individual instruction. Technology can help students and teachers alike. An exploration of classroom technology to enhance learning is presented in this article. Electronic whiteboards are great for group lessons. For group presentations, they are utilized to increase learning and engage students. Whiteboards may teach Languages, Social Studies, Science, and Mathematics. In order to assist students, learn fast, electronic whiteboards allow teachers to project from a laptop onto the board and sketch on it. Modern classroom technology includes flipped learning. Students can now view lectures on school servers from their personal laptops or mobile devices. Then, in class, students can debate the videos together. Teachers can use personal gadgets to communicate with pupils one-on-one, improving learning outcomes.

Desktop and laptop computers are seeing a rise in the number of educational software programs and apps. This necessitates the purchase of

high-end computers with strong CPUs for use in educational institutions. Helps students' records be managed and stored using classroom software. Using the internet instead of encyclopaedias and dictionaries reduces the need for cumbersome dictionaries and encyclopaedias. Previous researches proved that the use of IT (internet) will enhance the learning process and maximizes the student's ability in active learning (Finger & Trinidad, 2002; Young, 2003; & Jamieson-Procter et. al., 2013).

Monitoring software may aid in measuring the degree of knowledge of students by; testing for their recollection of Math facts, quizzing their comprehension of a book, or by giving an interactive lab complete with a virtual dissection. It is also possible that not all students will have access to the teacher's laptop screen, thus projectors are needed. A laptop is connected to a projector and the screen is projected onto a huge whiteboard in front of the class. Laptop screens may now be viewed by students in the rear, even if they are seated at the back of the classroom.

In addition, video conferencing allows students in distant regions to join a lecture via online streaming. Also, on Skype or Google Hangouts, Guest Speakers are able to speak directly to the students (Young, 2003). When giving talks from many locations, video conferencing may save money and time. Students can take their courses with them everywhere they go thanks to mobile technology. Students and educators alike may now take use of an increasing number of education-related applications. With the use of mobile devices, iPads, tablets, or other gadgets, instructors and students may maintain a connected classroom environment. Televisions may display current events in

a country, such as business news, presidential elections, and so forth. Classroom PCs can be linked together through a network.

Student activity on personal computers may be monitored from a central location by the teacher. A computer network guarantees that pupils do not depart from their instructions. In the event that a student deviates from the prescribed instructions, the central monitoring computer is notified. Students and teachers may easily share resources by connecting various classroom gadgets via networking. Distance learning portals have been created by schools and training institutes. By integrating video technology and pooled computing resources, students may participate in the classroom even if they cannot go to the venue.

There is little doubt that computers can be an effective and efficient teaching tool in the correct circumstances, according to Becker (2000). For students to utilize computers successfully in the classroom, instructors must be comfortable and knowledgeable with computers, have enough technological facilities and equipment, and easy access to these resources. Encouraging student-centered, constructivist teaching is also vital.

Becker (2000) discovered that few secondary school science and other academic courses utilize computers to obtain information, analyze ideas, or demonstrate and communicate topic comprehension. His reasoning included schedule conflicts, a lack of time to finish a full program, and the ease of internet access.

It's possible for students to take virtual field trips to any location in the world thanks to computers and the Internet. Field trips throughout the world and even into outer space may be organized using Google classroom

technology. As a result of advances in augmented reality and virtual reality, students may have access to experiences they otherwise would not have. Microsoft Word is installed by default on the majority of PCs. When it comes to composing and organizing data, Microsoft Office has all of the tools you need. Students may use these tools to create notes, verify the spelling of words as they write – using an auto-spell-check option – and store notes for easy access at a later date. Students can learn new words with the aid of word processing software. During class, teachers can demonstrate to pupils how to make effective use of various classroom tools. Students and instructors can use a 3D printer to create 3D models that can be used for educational or recreational reasons. Students learn more effectively when they are shown and explained a theoretical subject by an example, rather than simply reading about it. It is possible to design your prototype using computer-aided design tools while using 3D printing technology. Low-cost classroom technology that can benefit both students and instructors is available here.

Teng and Allen (2005) discovered that pre-service teachers' confidence in incorporating technology into their classrooms as in-service teachers increased when they used Blackboard's web-based learning environment. Study participants' self-reported computer skills and confidence in utilizing and integrating technology in future teaching grew after using Blackboard and electronic exchange of ideas. The advantages of employing technology in the classroom may persuade reluctant faculty members. The use of computers in the classroom is also linked to other characteristics, such as a preference for depth rather than breadth in teaching (possibly due to limited

constraints to cover vast quantities of knowledge) and block scheduling patterns that allow for extensive class times.

Finally, the research shows that utilizing computers outside of class time encourages pupils to take initiative rather than a standards-based, accountability-oriented strategy. As a result, despite their evident lack of dominance in academic topic classroom teaching, computers are playing a crucial part in current instructional reform attempts (Teng & Allen, 2005).

Becker (2000) agrees with Cuban that teacher overload may still limit classroom computer use. A valuable instructional tool, according to Becker (2000). Teachers' personal beliefs that promote student-centered constructivist pedagogy and enough technological facilities and equipment are some of the circumstances that improve classroom usage of computers, according to Becker. He claims that computers are seldom used in science, social studies, mathematics, and other academic areas. He attributed the situation to schedule issues, curriculum coverage pressures, and easy access to computers. However, despite the availability of instructional technology on college campuses, Kelly (2005) found that faculty members rarely use it. His research focused on faculty relationships, organizational support, professional development, and the use of technology for teaching and communication.

The current degree of technology use was compared to desired levels for instruction and communication, organizational support, and faculty professional development activities. Kelly found that most faculty members were open to using technology in education and communication. Researchers discovered that instructors wanted more technology in the classroom, greater organizational support for technology, and more professional development.

According to the report, faculty colleges should form a faculty technology development committee. An ongoing faculty-driven review and improvement process was also advocated.

According to Iding, Crosby, and Speitel (2002), instructors and pre-service teachers who use computers for personal use are generally adept with computers, have access to computers in schools and classrooms, and are interested in learning more about technology in education. The majority of teachers are ignorant of educational software that may assist them educate, and do not use technology for student portfolios, tutorials, demonstrations and simulations, or remediation.

Students study at their own speed, with varying levels of knowledge. Tutors can use technology to adapt classroom instruction. Traditional and digital schooling can help personalize teachings and make them more relevant. Some students learn better with visuals, while others prefer audio and podcasts. This review looked at several classroom technologies. Using technology in the classroom engages students by allowing for many teaching methods.

Basis for Technology Usage in Ghanaian Education System

Two main policy documents form the foundation for the technologies that will be used in Ghanaian schools in the twenty-first century. Two policies were highlighted by the Ministry of Education (2009) as influencing technology design, development, use and evaluation: ICT for education policy and Accelerated Development ICT policy (ICT4AD).

For almost a decade, the Ministry of Science and Technology, its development partners, and other private sector organizations have worked

together to incorporate ICTs into the industry. Initiatives have taken place at both the pre-tertiary and tertiary levels. Efforts have mostly been focused on providing computers and setting up ICT labs to these establishments in order to implement ICT. Only a limited number of people are able to participate.

There are still concerns about tertiary-level institutions despite the fact that they're doing well. The commercial sector has also launched a number of projects to establish community-based ICT centers. Urban regions have been the primary focus of these initiatives, but there are few examples of how they have been used to assist educational goals. Study of ICT in Education in Ghana (2005) reviewed and examined twenty programs to determine what lessons might be learned from their influence. Some notable accomplishments were recognized. Many students and instructors gained ICT skills thanks to the efforts, as well as an increased desire to learn more about ICT.

The New Partnership for Africa's Development (NEPAD) is another regional initiative addressing African issues. The E-Africa Commission, created in 2002, is presently implementing NEPAD ICT policies and projects. The e-School plan's main purpose is to guarantee that integrating ICTs into schooling systems leads to a systematic change. This transformation will strive to alter two things: first, the way education is administered and conducted to overcome flaws in present schooling models; and second, the use of ICTs to make the system more productive and efficient. Currently, Ghana is one of sixteen countries implementing the first phase of the NEPAD e-Schools Initiative demonstration project, which aims to integrate ICTs into secondary and primary school curricula to improve access, quality, and equity in education.

Several governmental programs have emphasized the use of ICTs in accomplishing educational goals. Distribution of the working-age population by educational attainment, based on the Ghana Living Standard Survey Report (GLSS V, 2005/06), the majority (53.2%) of persons eligible to work have no formal education. The report indicated further that, about one-third (32.2%) have only basic education while less than one in ten has secondary education. Just about 5 percent of those eligible to work have either post-secondary education (4.3%) or higher-level education (1.2%) (GLSS 5, 2005/2006).

The Ghanaian government has committed to an ICT for Development Policy (2003). This national policy tries to offer a framework and plan for how ICTs might be utilized to enable, among other goals, the national goal of “transforming Ghana into an information and knowledge-driven ICT literate nation” (p. 7). Achieving this goal requires promoting the use of information, knowledge, and technology in the economy and society as key drivers of socio-economic development; modernizing Ghana's educational system by utilizing ICT's to improve access to education, training, and research resources; and reviving the educational system.

It is the belief of Ghana's ICT in Education Policy that the use of ICTs is supported by a number of fundamental principles that guide its implementation. Some examples are: teaching/learning; management/administration; communication; as well as access to information. As a result, policy changes in the education sector as well as other associated fields including communications, local government, and rural development are expected to be critical to the success of these initiatives.

According to a country assessment by Mangesi (2007), the uneven execution of policies in the past has hindered the integration of educational technology in the Ghanaian education system as of now, tremendous progress has been done in boosting educational technology availability and use in the education sector. After secondary and primary/basic education, the university sector is the most equipped to use instructional technology, according to Mangesi's findings. To sum it all up, there's a lot of hope for enormous advancements once policy implementation and research into the best ways for integration into pre-service and in-service teacher curricula are complete. This demonstrates once more the need of investigating stakeholders' perceptions of technology in contemporary schools.

For example, Ghana's Ministry of Education has significantly increased access to education for the majority of the population and has significantly reduced the percentage of the population without any educational attainment (Government of Ghana, 2003). Education, literacy, and educational delivery and training at all levels are all highlighted in the ICT4AD policy. To prepare college and university instructors for 21st century classrooms, the Ghanaian government has recognised the necessity for educational technology, particularly ICT.

Tutors in colleges of education are one possible group of ESP 2010-2020 implementers. If the system wants to incorporate instructional technology without obstacles, instructors' perspectives are crucial. According to Yidana (2007), Ghana's ICT policy is the road map for the education sector's use of technology. To further understand how teachers perceive and

use technology in the classroom, research should be performed at Ghanaian teacher training institutes (Palak, 2004).

The nation's plan of action is to establish an educational system that meets the demands of the economy and society, particularly the information and knowledge-based economy and society. The Ghanaian government is committed to changing Ghana's agricultural economy into an information-rich, knowledge-based economy and society (Government of Ghana-ICT4AD, 2003).

Instead, the government has acknowledged the need for ICT training and education reform in schools, colleges, and universities. We can study and evaluate knowledge in new ways using ICT in schooling. ICT will improve education quality for everybody. As a result of this effort, the educational system and hence the lives of its residents have been transformed. To meet the difficulties of the twenty-first century, the government intends to modify the culture and practice of traditional memory-based learning.

Challenges to Instructional Technology Usage in Teaching in Higher Education

According to Ritzhaupt et al. (2012), educators are not integrating technology as effectively or efficiently as expected or necessary. Ertmer et al. (2012) found barriers to technology integration in individuals and organizations. Several researches have highlighted some challenges associated with the integration of technology in teaching and learning.

In contrast to personal obstacles, institutional barriers are those imposed by educational institutions, such as school districts or administrators (An & Reigeluth, 2011). Educators stated three levels of concern regarding

their own personal challenges (Aldunate & Nussbaum, 2013; and Uslu & Bumen, 2012). The first hurdle was instructors' apparent lack of digital expertise, understanding, and confidence (Kim et al., 2013). Aldunate and Nussbaum (2013) suggest that instructors often claim not being computer literate. They also indicate a lack of confidence in their ability to operate a software or manage difficulties that develop while using it (Kurt, 2013). These challenges are the most typical hurdles to teacher technology integration. The second obstacle was worry about technology and seeming foolish in front of pupils (An & Reigeluth, 2011; Inan & Lowther, 2010).

Teacher's fears about seeming incompetent or irritated when a student was better equipped to handle classroom technology were mentioned (Teo, 2011). Students' own perceptions that their curriculum was overcrowded and an emphasis on standardized testing criteria were the third barrier level (Hsu, 2010). Teachers who don't use technology often complained about not having enough time to construct new lessons that use it, or they claimed that to do so, they had to redo the whole lesson (Keengwe et. al, 2010). Teachers sometimes claim that they have little time for additional or novel activities in their current curriculum because they are overburdened with satisfying the criteria of standardized testing (Biancarosa & Griffiths, 2012).

There is a paucity of time for technology integration in schools, according to Mumtaz (2000). As part of a research done by the National Center for Education Statistics (2000), in-service educators were asked to identify the main barriers to utilizing computers in their classrooms and preparing resources for use with students. Teachers, on the other hand, complained that they didn't have enough time to practice utilizing computers

in their classrooms because of their normal class schedules. It's also common for instructors to point out that they don't have enough time in their schedules for computer usage with kids. According to the aforementioned research, roughly 80 percent of instructors polled felt that children were not given enough time to utilize computers. Despite the fact that some instructors really needed to utilize computers with their kids, there was no time to do so. It's not uncommon for educators to run out of time to adequately incorporate technology into the curriculum.

There were three degrees of institutional impediments as well (Potter & Rockinson-Szapkiw, 2012). The first degree of institutional hurdles was a result of the administration's lack of interest in integrating technology (Kopcha, 2012; Teo, 2011). Administration and supervisors frequently fail to see the necessity of technological integration, resulting in these kinds of constraints. The second level refers to the restricted training alternatives available to districts and schools (Kurt, 2013; Potter & Rockinson-Szapkiw, 2012). For instance, not having the financial resources to attend a technology-focused conference without taking time off work or incurring travel expenses are all instances of this kind of training restriction.

The absence of technology professionals or coaches on campus falls under the third category (Smith, 2012). Most schools don't have dedicated technology experts who work with teachers one-on-one or in small groups to help them integrate technology into their classrooms. A prevalent problem in school districts and schools that hire technology coaches is that they are allocated to help an unreasonable number of instructors (Smith, 2012). Beyond

the helpdesk's email and phone number, a third institutional barrier prevents users from getting IT assistance (Teo, 2011).

Bitner and Bitner (2002) wrote in an observation that "People do not always accept an invention, even if embracing it is reasonable and useful,"(p. 96). They went on to say that a school's support networks might be a major impediment to using new technologies. Teachers, administration, technical service, and students all have a role to play. If you're going to integrate technology into your teaching, you need a strong support structure to help you do it, which is why teachers are so important. This highlights the need for assistance in the technical and curricular domains.

There have been calls for educators to rethink how they approach integrating technology into the classroom, with the goal of improving student achievement (Vannatta, 2002). In order to successfully integrate instructional technology into teaching and learning, instructors do not need to be experts in a wide range of technology applications. Instead, they should feel comfortable and competent using instructional approaches that include technology.

Rethinking how instructors think about learning in order to recognize how computers might be utilized as a tool for knowledge building rather than teaching is advised (Schmind, Fresmire & Lisner, 2001). They cling to the idea that, because of the 'one user' architecture of the instructional software, the computers in the classroom are inaccessible. So, it is challenging to come up with creative solutions for pupils' particular requirements. Lack of follow-up support is also another challenge to technology. According to Bitner & Bitner (2002), "people do not always accept an invention, even if it is reasonable and beneficial." (p. 97). They emphasized that technological

hurdles might be centered on the school's support networks. Teachers, administrators, technical service, and students may all help. That is, although the teacher's role is critical to the program's success, the support structure is as vital. This highlights the necessity for technical and curricular assistance.

Teachers' ideas on technology integration have shifted from teaching about technology to supporting student learning (Vannatta, 2002). To successfully integrate instructional technology in teaching and learning, instructors must feel comfortable and secure in their instructional techniques of technology integration.

Teachers should rethink learning to regard computers as a tool for knowledge development rather than classroom administration (Schmind, Fresmire & Lisner, 2001). They maintain that access to computers in the classroom is restricted due to the 'one user' architecture of educational software. Thus, meeting pupils' particular requirements is tough. Because activities typically take place outside of school, lack of follow-up assistance is another issue. According to Mauza (2002), successful instructional technology use requires in-class guidance and support that is context-specific. He advised introducing and demonstrating programs to assist instructors incorporate technology into their classes. Hands-on and discussion of implications for teaching and learning should be done because activities often take place from the school site.

In order for instructional technology use to be successful, Mauza (2002) argued that in-class help, support, and context-specific aid must be offered. His recommendation was for programs geared to assist educators in integrating technology into their classrooms to be developed and

demonstrated. There has to be a hands-on demonstration and discussion of the implications of the presented applications for teaching and learning. There are several elements that contributed to the success of the integration (Mauza, 2002). He said that instructors found it simple to incorporate technology into the curriculum, taking into account the availability of equipment and their own ingenuity in the creation of the curriculum. He suggests that instructors must first realize the advantages of technology in the teaching and learning process before they are ready to use it in the classrooms.

According to the review, obstacles to successful use of instructional technology in teaching may be broken down into two separate categories: personal and institutional barriers. Each category has a varied number of levels. In addition to the psychological and institutional constraints, instructors' arguments for the lack of technology integration in the classroom have also been discovered by other academics. Personal hurdles include a lack of self-assurance, a lack of subject understanding in technology, a fear of technology and a fear of seeming incompetent in front of their pupils.

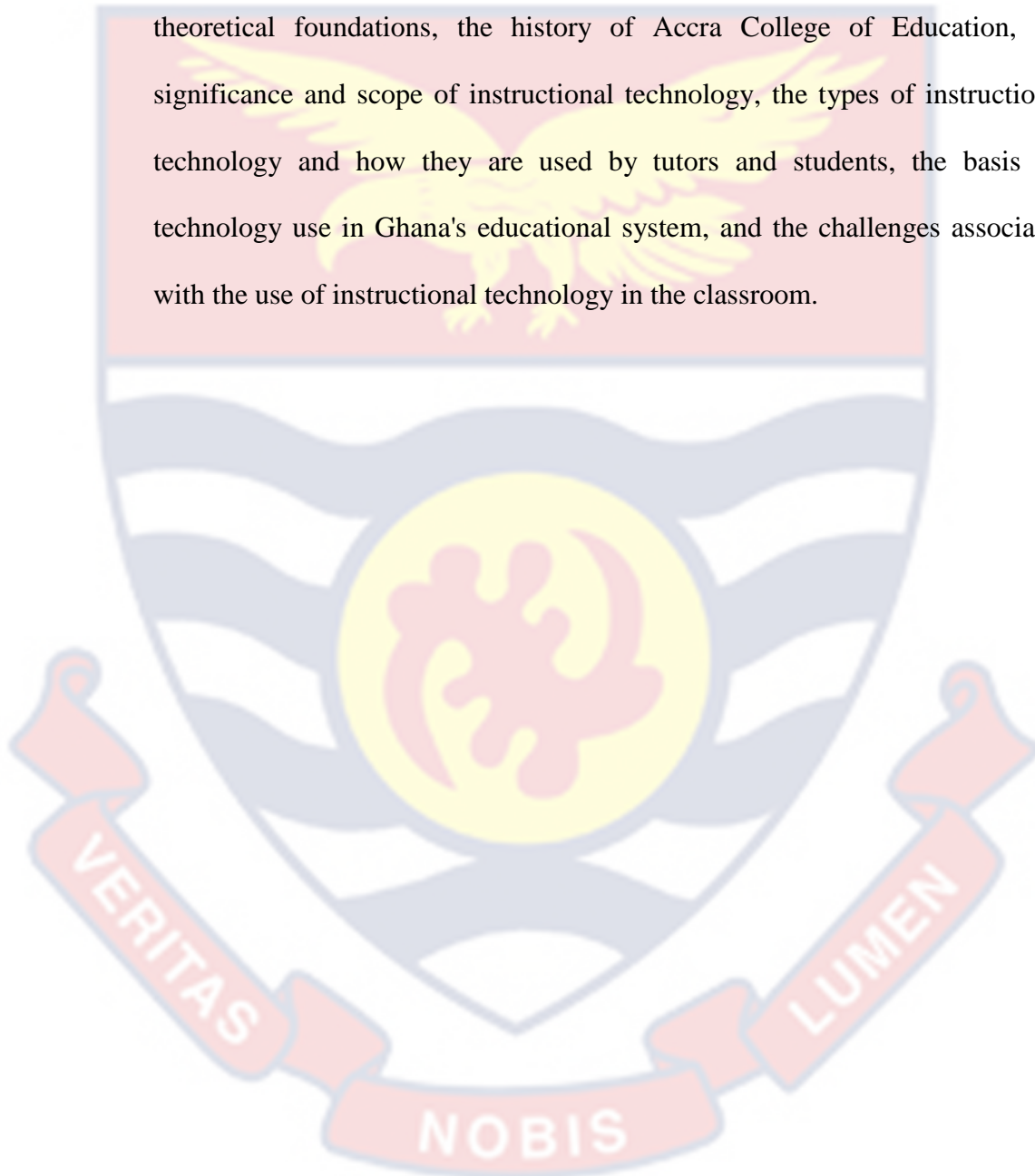
Chapter Summary

One of the most difficult occupations in modern culture is teaching because of the rapid expansion of information, which is accessible to students and instructors at the same time. Innovating technologies have opened up new career paths for educators, but they've also increased the burden on educators and students alike to learn how to effectively utilize these tools.

Instructional technology is a large and varied area that incorporates ideas from communication, cognitive psychology, management, computer science, and behavioural psychology. This review has shown that instructional

technologists are beginning to research and use the ideas of innovation dissemination. Increasing knowledge and expanding usage of diffusion theories might have a significant impact on instructional technology.

Accra College of Education's curriculum was examined, as were the theoretical foundations, the history of Accra College of Education, the significance and scope of instructional technology, the types of instructional technology and how they are used by tutors and students, the basis for technology use in Ghana's educational system, and the challenges associated with the use of instructional technology in the classroom.



CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter discusses the research strategy and methodology. It covers research design, population and sample, sampling strategy, research instrument, data collection procedure, data analysis procedure, and pre-testing. Researchers use the word "methodology" to describe how they approach a topic, according to Fouche and Delport (2005: 4). Research technique nowadays is thus centered on the organization and execution of study findings.

Research Design

The design for the work was descriptive survey research. This involves the collection of data in order to answer questions with regard to the subject of the study. A descriptive study investigates and reports existing conditions. According to Best and Khan (1989), descriptive research is concerned with the conditions or relationships that exist, such as determining the nature of prevailing conditions, practices and attitudes; opinions that are held; processes that are going on; or trends that are developed.

Descriptive survey research design was preferred because information was readily obtainable from teachers in their natural environment, concerning their opinions on the issues of the study. Descriptive survey research design presents an opportunity to fuse both quantitative and qualitative data as a means to reconstruct the "what is" of a topic/study. Trochim (2006) states that a survey research design is a very valuable tool for assessing opinions and trends.

The rationale behind this design was to collect data from respondents of the sample in order to examine the use of IT in teaching and learning. As an exploratory study, this design (which blends quantitative and qualitative data) best served the purpose of the study as it helped to collect data to describe the state of affairs. A mixed technique involving both quantitative and qualitative paradigm was more suitable in the study.

Population

In the words of Neuman (2003), the term "population" refers to a group of aims, events, or persons that have certain common traits. All tutors and administrators at Accra College of Education in Ghana are included in the target population. The overall number of participants was 65. This includes 54 Tutors, the Principal, two (2) Vice Principals, the College Secretary, four (4) Heads of Departments, and three (3) Lab Technicians.

Sample and Sampling Procedure

A sample, according to Strydom (2005), is a subset of the total number of things or individuals in research. For example, Sarantakos (1998) suggests that a comprehensive survey isn't always preferable to a sample survey. It is argued by Amedahe (2012) that the features of the population, such as size and composition, should be taken into consideration while selecting a sample for research. A sample size of 5% to 20% of the population is adequate for generalization purposes in most quantitative investigations, according to him. Also, Cohen et al. (2018) posit that for descriptive research, the sample size should be 10% of the population. However, if the population is smaller, 20% or more may be needed or required. The study was conducted using a total of 36 tutors (55.4%) out of the total population of 65 to respond

to the questionnaire and an additional five (5), were further purposively selected to be interviewed. The tutors were selected in the study because they are at the core of all the activities involving the impartation of knowledge to the trainee teachers.

Purposive sampling was adopted for this study considering the researcher's available knowledge concerning the sample subject, it provides control over significant variables of the study, homogeneity of subjects in the sample. This sampling method was adopted in order to allow the researcher to concentrate on people with particular characteristics who will be able to assist the researcher regarding the purpose of the study.

In all, a representative each from the following five (5) main categories of the workers in the college (Laboratory Technicians, Heads of Departments, Principal and Vice-Principals, and the Administrator) was considered as the interviewees. This was necessary so as to get an in-depth knowledge and also garner additional views across all staffs to augment what was realized from the responses to the questionnaire.

Table 1: Sample of Respondents (Questionnaire and Interview Participants)

Respondents	Number
Tutors	36
Principal	1
Laboratory Technician	1
Vice-principal (academics)	1
Head of Departments	1
College Secretary	1
Total	41

(Source: Field work, 2020).

Tutors, Laboratory workers, Department Heads and "top Management" were all stratified into four (4) groups using the researcher's approach of stratified sampling. Stratified sampling was used in order to identify and categorize each category. Because this method enhances the accuracy of estimations, it was more efficient than the previous method. A total of 41 (63.08%) of the total population were sampled for the study.

Non-probability sampling is used by researchers to find populations and circumstances where the particular processes being investigated are most likely to occur, according to Strydom (2005). For researchers, purposive sampling refers to the selection of their sample from the population and the study's purpose, according to Earl (2002). In order to gather an extensive data on the subject of the study, a semi-structured interview was carried out in addition.

A letter was sent to the Principal and Vice-Principal Administration to assist with the selection of the five (5) for the interview. The Principal, Vice-Principal (academics), the College Secretary, one (1) Laboratory Technician and the Head of ICT department were selected accordingly. In all, five (5) interviewees were purposively selected to be interviewed. Using this method (judgmental sampling), the researcher selects respondents who are relevant to the issue. According to Carpenter and Suto (2008), using six to eight participants in a qualitative research maximizes time spent gathering detailed data and ideas. Draper and Swift (2011) concur that qualitative research produces richer data with fewer respondents.

The researcher is certain that the sample is as representative of the population as feasible, and that the sampling procedures used evaluated other significant elements in the population that may endanger the study's validity.

Research Instruments

Appendix A and Appendix B comprise the questionnaire and interview guide used to collect data for this descriptive survey research using mix technique including both quantitative and qualitative paradigm. To do descriptive research, a questionnaire is a useful instrument according to Saunders, Lewis, and Thornhill (2009). As part of the study, an open-ended and closed-ended questionnaire was employed to gather data from the respondents.

The closed-ended questions required respondents to choose the correct response from a list of possibilities. The use of a combination of closed-ended and open-ended questions in exploratory research helps the researcher derive relevant conclusions from the investigation. The tutor's questionnaire has five (5) primary divisions arranged in alphabetical order. Personal information (Bio-data) was sought from respondents in Section A; Section B focused on instructional technologies. A four-point Likert rating scale (strongly agree, agree, disagree and strongly disagree) was accordingly used. Section C also examined the instructional technology utilization patterns of tutors using 'very often, often, seldom and none'; and Section D finally examined the difficulties that tutors face when using instructional technology.

To synthesize the data collected from the surveys, an interview utilizing an interview guide with eight open-ended questions was undertaken

(see Appendix B). Interviews are used to get comprehensive information about a subject's opinions or impressions (Berger et al. 1989).

Pre-Testing of Instrument

Experts in education were consulted to ensure the instrument's validity. The supervisor approved the instrument. A pre-test was conducted at Mount Mary's College of Education in Somanya, in the Eastern Region of Ghana, to assess the questionnaire's reliability, consistency, validity and relevance.

Mount Mary's College of Education in Somanya, Eastern Region, Ghana, was chosen for pre-testing due to its proximity and similarity to Accra College of Education. Their geographical locations at central core points attract the attention of government, NGO's and other philanthropists. Mount Mary's College of Education in Somanya in the Eastern Region of Ghana is located at the district capital and also receives more attention from the Roman Catholic Church in Ghana because it is a mission school.

Due to the geographical location of Somanya, it has a growing population with young adults, graduates, and other workers migrating from the hinterland to settle there with a similar trend as Accra. The two towns take in settlers from the perimeter. Both communities' literacy levels are steadily increasing thanks to technological advances. Compared to other colleges in the hinterland, most residents, including tutors, are likely to have high academic and social status. Mount Mary's College of Education, which is in a different District from the study area, was chosen for the pre-testing based on these similarities.

Leedy (1997) recommends pre-testing all questions on a small population. This pre-testing was vital in identifying poorly phrased questions, ambiguities, and items that respondents had difficulty comprehending. The questionnaire was completed by ten instructors, the principal, a laboratory technician, and the vice principal (academics). The students were chosen at random, whereas the Principal, Vice, and Laboratory Technician were purposively chosen. The questionnaires were provided to the respondents and collected three (3) days later.

The researcher utilized the alpha coefficient technique, often known as Cronbach's alpha, to assess the instruments' reliability. The researcher analyzed the respondents' replies using SPSS. Cronbach's alpha reveals that scale reliability is determined by the correlation of the scale's individual items or measures to their variances.

The SPSS (version 16.0) statistical program was used to examine the reliability of the research instrument utilized in this investigation. The study employed sum variables (mean square variance between participants) because they were more reliable than single variables (Kautto-Koivula, 1993). The sum variable reliability estimations were calculated. As a consequence, alpha reliability was 0.742. (Refer to appendix F). The research tool is very reliable (Saunders, Lewis & Thornhill, 2000).

An initial test was conducted to see whether or not the questionnaire's questions were appropriate for gauging the study's variables, as well as to assist in any required revisions. It was possible to standardize the questions and scores for analysis since the questionnaire had been revised for fieldwork. Items 4, 27, 28, and 30 have been reworded. A pre-testing of the interview

guide was also conducted in the same College of Education in order to uncover any potential problems or inconsistencies with the research. The pre-test interview was to assess instrumentation rigor and formulate measures to address any limitations or threats to bias before carrying out the actual phase of the research. Protocols for systematizing the translation and transcription of interview and field notes were also integrated into the pre-test. The practice of pretesting is highly regarded as an effective technique for improving validity in qualitative data collection procedures and the interpretation of findings (Bowden, Fox-Rushby, Nyandieka, & Wanjau, 2002).

Additionally, the pre-testing offered the researcher with an insight into the fieldwork's techniques and also gave the researcher an indication of how long it would take to subsequently finish the final questionnaire and interviews, which was really helpful.

Data Collection Procedure

Survey and interviews were used by the researcher to get information from participants. Tutors at the College of Education, where the research was conducted, were given a questionnaire. The respondents were informed of the goal of the study by the researcher. For this reason, they were informed that any information they submitted would be kept private and used exclusively for research purposes. Respondents were given a maximum of a week to complete the survey.

In order to get the Principal's authorization, the researcher tended in a letter from the Institute for Educational Planning and Administration-IEPA (see attachment H) that introduced the researcher as an M. Phil degree candidate who is doing research. Respondents were given enough time to go

through and answer the questions, and those who wanted clarification were given assistance. The researcher followed up on the seventh day and collected the remaining questionnaires in accordance with the COVID-19 guidelines. An additional interview was also done with five people, purposively selected, to get further insights. The interviews lasted not more than 20 minutes. As a result of COVID 19, which was still a worldwide pandemic, an online interview was chosen for this interview because of observance of its procedures. A one-on-one interview was performed using internet conferencing technology (zoom). COVID 19's social distance criterion necessitated this kind of behavior.

The interview was captured in both audio and video forms after it had been conducted. During the sessions, participants had the option to turn their cameras on or off. The audio was then transcribed into a Word document and a video file. Participants were able to take the online call at a time and location that worked best for them. However, it was advised that a quiet and secluded area with a decent internet connection be picked.

An email address was supplied by the researcher for participants to contact him or her. As Wendler and Wertheimer (2017) point out, this is a way to ensure the study's internal validity by minimizing any potential influence on the participants' decisions to participate. As soon as potential participants made contact with the researcher through email, they were given a PIS and a permission form, both of which they completed and returned over the same medium (see appendices C and D).

Two further follow-up email reminders were issued to those who hadn't responded until all the participants had provided input. Emails were

sent out to the respondents with a copy of the permission form (see appendix C) and an appointment time set. In advance of the interview, participants completed and sent back consent forms.

Data Analysis Procedure

This research included quantitative and qualitative data analysis techniques. Simple frequency and percentages were used to characterize the tutors' demographics. Analyses of survey responses were carried out with the help of Statistical Package for the Social Sciences (SPSS) version 28.0.

Descriptive statistics were utilized to examine the questions in connection to the associated research topics and the items included in the questionnaire. The closed-ended questions used to collect quantitative data, was analyzed using frequency distribution tables, percentages, and graphs. Primary data collected from the field was edited first to eliminate the misplaced responses given during the collection of the data. The responses were then coded for analysis. Coding was done to summarize the responses given by the respondents for analysis. The coded items were analysed with the aid of a computer using Statistical Package for Social Sciences (SPSS) version 20 as a tool for analysis.

Data collected through interviews were also analyzed using themes approach. They were transcribed, then examined for common themes that emerged. The data was initially read by the researcher and subsequently placed in sub topics of the study as per the objectives of the study. i.e. all responses about kinds of IT, utilization patterns, challenges faced were grouped together. The common patterns in each category were identified. The researcher wrote narrates in each category using quotes from interviewees and

finally, interpreted narratives from respondents to gain meaning out of it. All categories of data were led by the research questions. There was a literature control undertaken to integrate all of the ideas with appropriate literature, and these themes were then contrasted and explored further. The semi-structured interview responses were sorted into patterns and themes, with an explanation of why and how respondents felt about the scenario and condition in various situations. (Bell, 1999; Denscombe, 2003).

Ethical Consideration

To carry out any research the researcher needs to follow different sorts of code of conduct which is an essential aspect in research. Therefore, for maintaining the ethics, the researcher would always respect self-esteem and dignity of the research participants. At first the researcher elaborated the whole things related to the study to the Principal and sought permission. Prior to the data collection process respondents were informed about the purpose of the study and were assured that confidentiality would be maintained. They were made to complete consent forms (refer to appendix D). Then the researcher, built trust with them that the collected data or opinions were solely used for research purpose.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents and analyses the data collected for the study. Discussions of the findings are also presented. The analysis is done on the basis of the biographic data of the respondents and research questions. In all, 36 Tutors were selected to respond to the questionnaire, but only 33 did so, resulting in a return rate of 91.67 percent. In addition, all five (5) participants who were chosen for the interview participated and were recorded for further study.

Socio-demographic Characteristics of Respondents

The researcher gathered information on the Tutors' backgrounds and personalities in order to get an accurate picture of the participants. All of these factors were taken into consideration: age, gender, teaching experience, length of service at the institution, and education level.

Age of Tutors

Table 2 presented the age distribution of tutors

Table 2: Age Distribution of Tutors

Age	No.	%
24 & below	0	0
25 – 29	2	6.06
30 – 34	4	12.12
35 – 39	5	15.15
40 – 44	9	27.27
45 & above	13	39.39
Total	33	100.00

(Source: Field Data October, 2020)

Table 2 shows that most of the tutors 13 (39.39%) were 45 years old and above. This was followed by 9 (27.27%), those in age bracket 40-44; and 5 (15.15%) also in age bracket 35-39. It is clear that majority of the tutors who participated in the study 27 (81.8%) at Accra College of Education are aged 35 years and above. This implies that few respondents 6 (18.2%) are below 35 years old.

According to Bill (2013), the age of tutors has an impact on the usage of instructional technology in teaching and learning. Based on the International Institute for Educational Planning's (IIEP) categorization, tutors younger than 45 years of age might be considered retrainable and more likely to use instructional technology in their teaching. In contrast to their elder colleagues, younger teachers are more likely to use instructional technology (Adams, 2002).

Gender of Respondents

Figure 2 below illustrates the gender of the respondents:

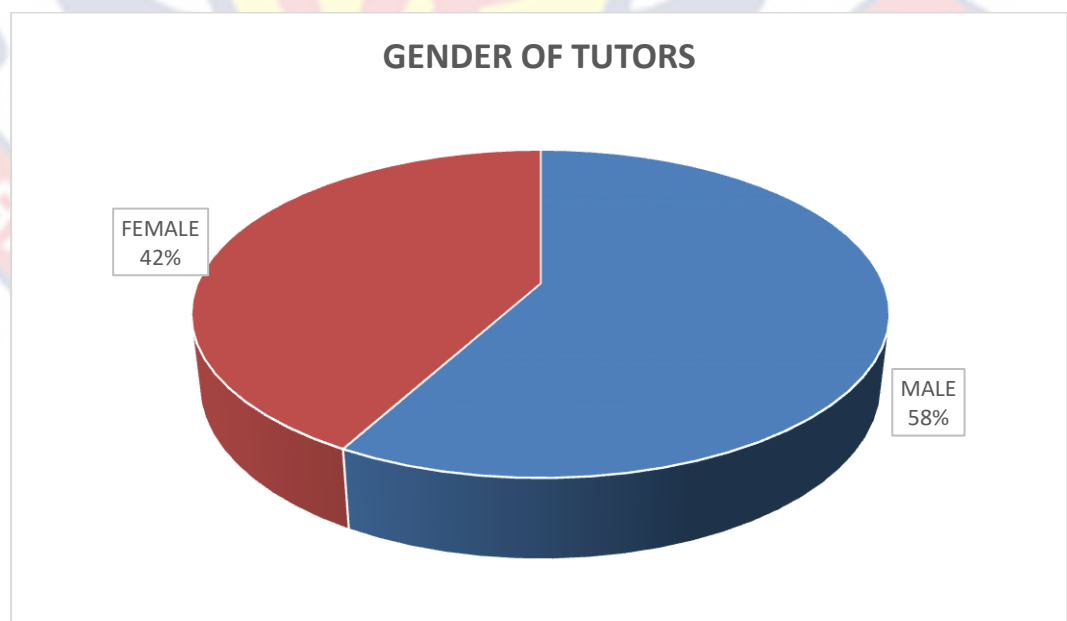


Figure 2: Gender of Tutors

From Figure 2, over half of the tutors 19 (58%) were males and the remaining 14 (42%) females. It can be concluded that most of the tutors at Accra College of Education were males.

Teaching Experience

Respondents were asked throughout the survey how long they had been working in the Ghana Tertiary Education Commission (GTEC). Detailed responses are provided in Table 3.

Table 3: Teaching Experience of Respondents

Years of Teaching Experience	No.	%
Below 1 year	-	-
1 – 5 years	-	-
6 – 10 years	3	9.09
11 – 15 years	2	6.06
16 – 20 years	5	15.15
21 – 24 years	13	39.40
Over 25 years	10	30.30
Total	33	100.00

(Source: Field Data October, 2020)

Table 3 indicates that most of the respondents have been teaching over 20 years. A total of 23 (69.7%) have been teaching for the past 21-24 (39.40%) years and over 25 years (30.30%). None of the tutors of Accra College of Education has been teaching for less than six years. This shows that majority of the tutors are quite experienced.

Number of Years Tutors had been Teaching in Accra College of Education

A follow up question was asked to ascertain how long the tutors had taught in the school. Table 4 presents the duration of service of the tutors specifically in the College.

Table 4: Number of Years in Accra College of Education

Number of Years	No.	%
1-4 Years	6	18.18
5-9 Years	21	63.64
10-14 Years	4	12.12
15 Years and above	2	6.06
Total	33	100.00

(Source: Field Data October, 2020)

Table 4 indicates that a significant proportion of the tutors 21 (63.64%) have worked in the College between five to nine years. Only 2 (6.06%) have been in the College for over 15 years. This implies that the tutors had spent enough years in the College to provide the needed information for the research.

Qualification of Respondents

Figure 3 presents the qualification of respondents

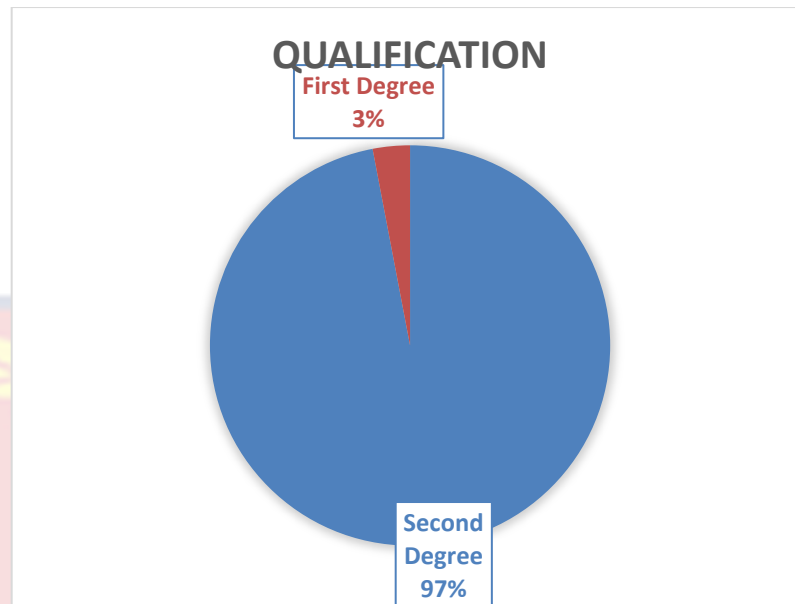


Figure 3: Qualification of Respondents

(Source: Field Data October, 2020)

Almost all of the respondents 32 (96.97%) are masters' degree holders at the time data was gathered in the Accra College of Education as shown in Figure 3. It was realized that only the ICT Laboratory Technician had a bachelor degree whereas all tutors had a second degree. None of the tutors had a Doctorate Degree.

Analysis of the Main Data

Research Question One: What kinds of instructional technology are mainly used by most tutors in Accra College of Education to support teaching?

This research question sought to find out the kinds of instructional technology that are commonly used in teaching by most tutors in Accra College of Education. Table 5 summarized the details of the responses respectively.

Table 5: Kinds of Instructional Technology often use by Tutors

Perceptions of Tutors on kinds of instructional technology	Response		Category D	SD	Total 33(100%)
	SA	A			
Presentation software/visual aids	25 (75.8)	8 (24.2)	- (-)	- (-)	33 (100)
Web browsing and emails	- (-)	4 (12.1)	20 (60.6)	9 (27.3)	33 (100)
Microsoft Word / Excel/Access for class assignment	2 (6.1)	11 (33.3)	12 (36.4)	8 (24.2)	33 (100)
Making a classroom course available online (via Skype, blogs, twitter etc)	1 (3.0)	- (-)	20 (60.6)	12 (36.4)	33 (100)
Microsoft Power-Point for presentation in class	14 (42.4)	19 (57.6)	- (-)	- (-)	33 (100)
SPSS for data analysis in class and research work.	- (-)	7 (21.2)	13 (39.4)	13 (39.4)	33 (100)
Internet/E-Mail for research and instruction/WIFI	9 (27.3)	18 (54.5)	4 (12.1)	2 (6.1)	33 (100)
Computers to store data and records	4 (12.1)	- (-)	26 (78.8)	- (9.1)	33 (100)
Teaching with tablet computers/ Ipads/mobile devices/tablets/Televisions	8 (24.2)	4 (12.1)	9 (27.3)	12 (36.4)	33 (100)
Using electronic whiteboards for instructions/projectors as a medium of instructions	17 (51.5)	16 (48.5)	- (-)	- (-)	33 (100)
Teaching on school servers for students	- (-)	6 (18.2)	17 (51.5)	10 (30.3)	33 (100)
Video conferencing via skype or Google hangouts	5 (15.2)	3 (9.1)	11 (23.3)	14 (42.4)	33 (100)
Information visualization tools	- (-)	9 (27.3)	21 (63.6)	3 (9.1)	33 (100)
Recordings on	8	6	19	-	33

CD's/DVD's/3D models	(24.2)	(18.2)	(56.6)	(-)	(100)
Online projects and collaboration tools	9 (27.3)	3 (9.1)	13 (39.4)	8 (-)	33 (100)
Flipping the classroom (using tools such as videos, podcasts, online quizzes)	11 (33.3)	20 (60.6)	2 (6.1)	- (-)	33 (100)
Games	4 (12.12)	6 (18.2)	3 (9.1)	20 (60.6)	33 (100)

(Source: Field Data-October, 2020)

Key: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

A look at Table 5 shows that all the respondents agreed/strongly agreed that: Presentation Software/Visual Aids; Microsoft PowerPoint for presentation in class; and Electronic Whiteboards for instructions/Projectors as a medium of instructions were the kind of instructional technology mainly used by most tutors in Accra College of Education to support teaching.

In addition, significant percentage 9 (27.3%) and 18 (54.5%) of the respondents strongly agreed and/or agreed that they use 'internet/e-mail/WI-FI for research and instruction'. Also, quite a significant number of the tutors 20 (60.6%) agreed and 11 (33.3%) strongly agreed that they use tools such as videos, podcasts, online quizzes to support flipping the classroom teaching strategies.

Going by the analysis, it was found that the kind of instructional technology mainly used by majority of tutors in teaching in Accra College of Education includes: presentation software/visual aids; Microsoft PowerPoint for presentation in class; electronic whiteboards for instructions/projectors as a medium of instructions; internet/e-mail/WI-FI for research and instruction; and tools such as videos, podcasts, online quizzes.

A study by Altun, Sinan, Mergan, Pasa, and Ayhan (2011) found that many teacher educators and teacher education programs have experimented with the use of instructional technology tools such as projectors, computers, Wi-Fi networks, computer research centers and broadband, recorders and electronic slates and bulletin boards and videos and slides over the years because of the education system.

The results of Haddad and Draxler (2002), who identified at least five phases of technology use in education, corroborate this as well. For presentations and demonstrations, a variety of media may be used, including audio/video cassettes, radio and television broadcasts, podcasts, computers, or the internet. One exception to this is video, which is not permitted for practice or drills. While this may be true, the internet and networked computers allow for the most effective interactive and collaborative learning.

By incorporating technology into their courses, pre-service teachers have a chance to interact with instructional technology (such as electronic whiteboards or projectors; internet/email/Wi-Fi; and tools such as movies and podcasts). Attending this seminar helps pre-service teachers become familiar with and adept at using instructional technology (Altun, et. al, 2011). Flipped classroom education is supported by research, as shown by data from the academic literature. Flipped classrooms, according to Levin and Schrum (2013), are achievable because of technology's role in streamlining the process and providing structure.

It was possible to learn more about the types of instructional technologies tutors use by conducting semi-structured interviews. In this part, the researcher conducted an interview and listened to participants own voice.

In order to explain the idea to students utilizing instructional technology tools or apparatuses, tutors accompanied them to the school multi-media center after lecturing in lecture rooms that were not equipped with ICT resources.

A few tutors opted to take their students to the school multi-media center to utilize whiteboards, computers, projectors, and Wi-Fi offered by the school, while others used their own personal laptops, Wi-Fi for internet, or projectors to integrate instructional technology into their lectures. Opining the similar view one of the interviewees reacted that:

"For example, in most lecture rooms, for the most part, before they send them to the school multi-media centre, they teach them, in theory, the different concepts in the subject area, and then later sent them there so they can see for themselves the concepts showed utilizing the displayed image on the computer and whiteboards" (Interviewee, 2).

The interview confirmed Interactive whiteboards (SMART Boards); Websites and Blogs; internet/Wi-Fi and projectors as the major kind of instructional technology used by tutors in teaching. Also, tools such as videos, podcasts, and online quizzes were used to support the flipped classroom teaching strategy.

Another participant indicated that some tutors utilize their personal initiatives in consolidating instructional technology in teaching. He explained that:

"As should be obvious in their pack is their workstation. They have a lot of videos that they use in teaching their subjects. They begin by explaining the concept to the

students since they can't visualize the process then further play videos on their personal computer. They use computers, internet/Wi-Fi, projectors and". (Interviewee, 4)

A significant number of tutors who actively use instructional technology to support their teaching made mention of projectors, one of the participants explains that:

"Sometimes tutors prepare their lessons utilizing PowerPoint, slides and present to their students utilizing overhead projectors". (Interviewee, 5).

Another participant similarly commented:

"Fundamentally after completing basic academic classes in a regular school classroom. Some take their PC to the ICT laboratory and make use of the projector to project images". (Interviewee, 1)

Participants said that projectors can be utilized to benefit a large number of students at once because of their location and student-teacher ratio in the school. One of the interviewees was able to articulate this clearly:

"The devices are limited around the schools so they often use what is available, they use a projector, to project the images with the goal that it can reach a large audience. SMART Boards, Websites and Blogs are used ". (Interviewee, 3).

According to Interviewee 4, some tutors use their phones and iPads to demonstrate real-life images to their students and as a reference source when they are teaching their lessons:

“They have an Apple iPad here with them which they often use”

Another participant stated:

“When teaching, some keep their Tablet besides them to verify what they are teaching and to check from other sources online using the internet or the Wi-fi” (Interviewee 1).

A participant further reiterated that:

“tutors use their phones as well. Sometimes they might be in a class and a student makes a challenging inquiry or in cases where they need to relate what is being taught to real life circumstance, they may simply use the phone to browse through materials related to the lesson they are teaching”.
(Interviewee, 5).

Furthermore, from the analysis, four of the interviewees succinctly stated that not all the tutors use instructional technology directly in the teaching process yet in an indirect way that ensures effective teaching. Pedagogic use of instructional technology may not exclusively be the direct use of the tools in the classroom yet in addition indirect uses of the apparatuses (passive usage) that facilitate the teaching process. They acknowledged that:

“they use their mobile phones and recent mobile applications like Viber and WhatsApp to communicate with

the students giving them academic directives in their subject areas". (Interviewees voice, 2020).

Likewise, some tutors assigned students to discover information over the internet in their subject area. Another participant said:

“So fundamentally few tutors use tools such as videos, podcasts, online quizzes for flipping classroom strategy in teaching”.

(Interviewee, 2).

In exploring the interviewees' opinions on the kind of instructional technology tutors use in teaching it was found that, the interviewees gave Microsoft PowerPoint, videos, overhead projectors, internet, Wi-Fi and electronic visual aids in teaching as the instructional technology that they saw being used at the Accra College of Education by most tutors. It could be concluded that though the interviewees' opinion is similar to that of the questionnaire respondents, it was revealed in addition that, some tutors instruct students in their various subject areas via the use of modern mobile apps such as Viber and WhatsApp, as well as by assigning them the task of doing research online.

It was found from the interview that whereas some tutors directly use instructional technology to support their teaching in lecture rooms, others indirectly use it. They encourage students to use the internet facility and mobile smart phone bundles to do assignments back at the hostels at their private times and bring their findings. It was established also that, only one of the interviewees indicated that the tutors use tools such as videos, podcasts, online quizzes for 'flipping classroom' strategy in teaching. However, on the contrary, most respondents to the questionnaire stated that tutors use tools

such as videos, podcasts, online quizzes for ‘flipping classroom’ strategy in teaching.

The findings confirm what Teng and Allen (2005) contended that ICT/Internet is playing a crucial part in current instructional reform attempts.

Tutors can use technology to adapt classroom instruction.

Research Question 2: What are the instructional technology utilisation patterns of tutors in Accra College of Education?

The study sought to find out the pattern of utilisation of instructional technology by the tutors in the Accra College of Education. It looked at frequency of instructional technology use among tutors, how often tutors use specific or different kinds of instructional technology to support their teaching and implication of Roger’s Theory of innovation as discussed in the literature review (applicability of Roger’s Theory of innovation).

On the frequency of instructional technology use for professional work both at home and on campus to support teaching, the respondents were provided four options such as very often, often, seldom, and never to rate. Their responses are illustrated in figure 4

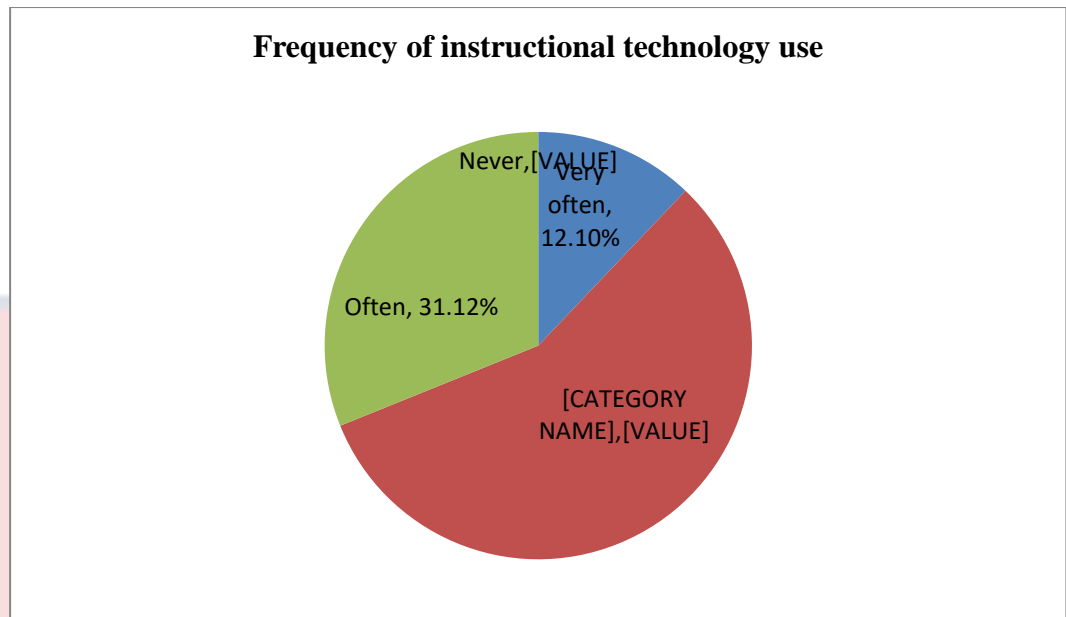


Figure 4: Frequency of Instructional Technology Use among Tutors

(Source: Field Data-October, 2020).

From Figure 4, over half (56.78%) of the tutors indicate that they “seldom” use instructional technology, while (31.12%) said “often.” 12.10% indicated “very often,” while none of them chose the option “never.” The majority of respondents seldom utilize instructional technology to complement their teaching. This means most tutors at Accra College of Education do not utilize instructional technology very frequently. They seldom employ pedagogical technology. It is clear also from Figure 3 that all the tutors either very often, often or seldom use at least one or the other instructional technology to support teaching since nobody selected the option ‘none’ on their response to the item on the frequency of instructional technology use for professional work both at home and on campus to support teaching.

According to Becker (2000), just a third of instructors in the United States use computers regularly, despite the majority owning one. In Science, Social Studies, Mathematics, and other academic subjects, just a fraction of

students utilize computers to gather information, analyze ideas, and demonstrate and communicate topic comprehension.

The findings of the study are in line with the views of Ritzhaupt et al. (2012), who stated that without instructor leadership and assistance, students are less likely to utilize technology in educational tasks. In addition, research shows that instructors' comfort level with technology significantly influences students' involvement and productivity in the classroom (Uslu & Bumen, 2012).

Staff View on the Pattern of Instructional Technology Utilization

In order to rank the trend and level of usage of the different kinds of instructional technology (computers, videos, tape recorders and SMART boards and projectors) mainly used by majority of tutors in teaching as revealed earlier on in the analysis of table five (5) in research question one (1), respondents were further asked a follow-up question to indicate the pattern of instructional technology utilization using the following scale as well: very often, often, seldom and never.

Also, it was established further from Figure Five (5) that majority of the respondents seldom use instructional technology to support their teaching and the remaining either very often or often use it. Hence this part of the analysis which is a follow-up to the analysis of Table Five (5) and Figure Five (5) respectively, sought to explore further the actual type (as established in the preceding part of this work) the tutors employ in the occasion of using instructional technology. Table 6 features the distribution of respondents' perception.

Table 6: Staff View on the Utilization of Instructional Technology

Instructional tech. type	Very often	Often	Seldom	Never	Total
Video and Tape recorders	4(12%)	21(64%)	8(24%)	-	33(100%)
Educational Television	-	-	33(100%)	-	33(100%)
Environment (VLE)/e-portfolio	-	-	-	33(100%)	33(100%)
Learning management systems	-	-	-	33(100%)	33(100%)
Internet connected lecture halls	6(18%)	2(6%)	25(76%)	-	33(100%)
Computer Lab	-	29(88%)	4(12%)	-	33(100%)
Projectors/SMART boards	27(82%)	6(18%)	-	-	33(100%)
Broadband for internet	-	-	-	33(100%)	33(100%)
Computers for academic work	30(91%)	3(9%)	-	-	33(100%)
Wi-Fi network for internet	18(55%)	15(45%)	-	-	33(100%)

(Source: Field Data – October 2020).

In Table 6, it is clear that all of the instructors said that they often used computers, projectors/SMART boards, and Wi-Fi networks in their instruction. Specifically, concerning ‘computers for academic work’ 30 (91%) said ‘very often’ and 3 (9%) gave ‘often’. On the use of ‘Wi-Fi network for internet’ whereas 18 (55%) indicated ‘very often’, 15 (45%) said ‘often’. Also, regarding ‘Projectors/SMART boards’ 27 (82%) said ‘very often’ and the remaining 6 (18%) chose ‘often’. Also, majority 25 (76%) of the tutors indicated that they very often/often use video and tape recorders to support their teaching in the college, while few 8 (24%) said they ‘seldom’ use video and tape recorders.

Using computers, projectors/SMART boards, and a Wi-Fi network to access the internet is the most common instructional technology used by tutors who utilize instructional technology to supplement their teaching. It implies that when tutors have video/audio/CD and Tape recordings they can conveniently use that to support their teaching using the computer without necessarily using Wi-Fi/broadband network for internet always in the classroom. It is not surprising from the analysis that most 25 (76%) tutors in Accra College of Education stated that they very often/often use video/audio/CD and tape recordings.

Implication/Applicability of Roger's Theory of Innovation

Less acceptance of instructional technology means less utilization, according to the research. The innovators' viewpoint may help spread new innovations by evaluating five features or attributes (2003). This part discusses the findings with reference to the applicability of Roger's Theory of Innovation

Roger's Theory will be utilized to explain the findings, in addition to the previous discussion of frequency of usage. This aims to encourage tutors at the Accra College of Education to employ instructional technologies.

There were some instructors who began their classes by introducing ideas in their various disciplines utilizing the traditional educational style. A school lab/multimedia centre was used instead of a lecture room since not all classrooms had ICT equipment.

For example, although some instructors used the school's limited number of multimedia devices to educate, others incorporated instructional technology into their lecture rooms on a personal level. It can be inferred from

the findings that perhaps most tutors in Accra College of Education are not very comfortable going through this hustle just to use instructional technology to support their teaching. Many educational institutions lack the assistance needed for the creation and implementation of instructional technology (Georgegan, 1994, Page 4), and it is sad that this support isn't prioritized in the academic context. A lack of computer access in most lecture rooms was addressed in the responses to the questionnaire and the interview. The participants felt that the school and lecture room infrastructure needed to be upgraded. Computer access in lecture halls is vital for the effective use of instructional technology in teaching. In this study, instructors at Accra College of Education employed instructional technology in different ways. A prospective adopter decides whether or not to embrace an invention based on its features. Trialability, compatibility, complexity, relative advantage, and observability are all qualities of innovation. Uncomplicated innovations that are superior than competitors (or the status quo) are more likely to be accepted.

Trialability and observability are two innovative qualities that may boost adoption rate (Rogers, 2003). As a result, tutors should have enough access to instructional technology (internet, computers, and peripherals). Then they may see each other using instructional computers and test out computers as required. As summarized by the literature and this research, accessibility and availability of computers influenced the usage of computers in education (Medlin, 2001; Surendra, 2001).

It's been found out from the study that, in spite of all odds, at least all of the tutors use instructional technology available to support their teaching.

This implies that most of the tutors in Accra College of Education at least use instructional technology in one way or the other to support their teaching. The majority (either seldom, often or very often) use instructional technology in teaching. Rogers' (2003) relative advantage, compatibility, and complexity attributes are related to attitudes of individuals.

Conformity, simplicity, trialability, and observability are all attributes that Rogers (2003) claims will accelerate the adoption of innovations. It is true that 'getting a new concept accepted, even when it has clear benefits' (p. 1), therefore having all of these factors of creativity available speeds up the diffusion process. All of these criteria affected faculty members' willingness to embrace new technologies into their classrooms (Bennett & Bennett, 2003).

If a faculty member is interested in using new technology in the classroom, he or she may be affected by several factors, according to Medlin (2001). Social, organizational, and personal information were categorized by Medlin. Friends, mentors, peers, and students all have a key role in a faculty member's decision to employ electronic technology in the classroom. Faculty members' use of electronic devices in the classroom was also influenced by the availability of physical resources and university restrictions. Personal interest in instructional technology, better teaching, and student learning were all cited as potential motivators for staff to use new technology in the classroom.

All of Medlin's (2001) elements influencing faculty members' desire and choice to employ new electronic devices in classroom teaching were present in this research, according to qualitative and quantitative analysis. As a consequence, despite the limitations, all tutors at Accra College of Education

employ instructional technology to enhance their teaching. The tutors' perceptions regarding these traits are vital since they are substantial determinants of instructional innovation spread (Surendra, 2001). It is critical that teachers regard computers as effective educational tools that are congruent with their ideas, and not as a complicated reality.

In short, the notion of innovation qualities is vital because it emphasizes the relevance of prospective adopters' views in the adoption process. Despite the fact that tutors are required to utilize instructional technology to train pre-service teachers in Ghana, attitudes of prospective adopters (tutors) are crucial in the adoption process. Tutors play a big role in integrating technology into classrooms. The second research topic examined tutors' use of instructional technology. So, it looked at how frequently tutors utilize particular or various forms of instructional technology to complement their teaching, and the implications of Roger's theory of innovation.

It can be concluded firstly that majority of the respondents seldom use instructional technology to support their teaching. All the tutors either very often, often or seldom use at least one or the other instructional technology to support teaching. Secondly, majority of the tutors in using instructional technology to support their teaching very often use mostly computers, followed by Projectors/SMART boards and lastly Wi-Fi network for internet. Thirdly, most tutors very often/often use video/audio/CD and tape recorders.

Research Question Three: What challenges are faced by tutors in using instructional technology to support teaching in Accra College of Education?

Research question 3 underscores the perception of tutors about challenges they face in teaching with instructional technology in the College of Education. Table 7 features the distribution of respondents' perception.

Table 7: Challenges Faced by Tutors in Using Instructional Technology

Challenges	Frequency	%
Unreliable power/electricity supply	31	93.9
Problems of unreliable connectivity/ network access	30	90.9
Inadequate computer peripherals	27	81.8
Attitude of tutors and fear of change	25	75.8
Poor support from school authorities	22	66.7
Heavy load of individual teachers	14	42.4
Insufficient professional development	14	42.4
Inability to cope with complexities	12	36.4
Inadequate technical support	11	33.3
Computer technology is irrelevant to the course I teach	9	27.3
Curriculum/time table does not make provision	9	27.3
Inadequate computers in classrooms	9	27.3
Lack of time scheduled on school time table	5	15.2
Lack of motivation and incentives	3	9.1
Poor proficiency level of tutors	2	6.1

(Source: Field Data – October 2020).

Majority 31 (93.9%) of the respondents, as shown in Table 7, indicated that ‘unreliable power/electricity supply’, is a challenge. Also, 30 (90.9%) of the respondents mentioned ‘unreliable connectivity/network access’ as another challenge. In addition, 27 (81.8%) indicated their challenge as ‘inadequate computer peripherals’. 25 (75.8%) of the respondents also answered; ‘attitude of tutors and fear of change’, while 22 (66.7%) of the respondents indicated that there is always ‘poor support from school authorities’.

The main challenges faced by the tutors of Accra College of Education in the Greater Accra Region of Ghana in using instructional technology as drawn from the analysis are: unreliable power/electricity supply; problems of unreliable connectivity/ network access; inadequate computer peripherals such as printers, scanners, projectors among others; attitude of tutors and fear of change; and poor support from school authorities.

Findings corroborate Pelgrum (2001) who said that obstacles to technology implementation include lack of computers, teacher technology knowledge/skills, difficulty integrating technology into instruction, scheduling computer time and lack of technical assistance.

Less than enough equipment, poor skills, low assistance, time constraints, and the teacher's personal lack of enthusiasm or expertise of computers were all identified by Lewis and Smith (2002). It also confirms Kwacha (2007) findings that the most common barriers to effective technology implementation are lack of qualified personnel, high equipment costs, management attitudes, inconsistency of electric power and telephone lines, particularly in rural areas, and lack of technology programs in teacher education curricula and at the primary levels.

Interviews were conducted with a small number of participants in order to get more detailed information on the study's participants. It was fascinating to see how the participants reacted to the interview transcripts. Some of the participants' replies are included in the list below.

“There is problem with supply of electricity throughout the country Ghana which is often described as ‘domsor’- intermittent power cut” (Interviewee 1 voice, 2020).

Another participant also said:

“A lack of assistance from school officials for the integration of the many technologies used by the students is preventing them from acquiring the necessary equipment. The students utilize laptops, projectors, scanners, photocopiers, and mobile phones” (Interviewee 3 voice, 2020).

Respondent three replied that, though ITs uses has plays a significant role in their teaching, they are faced with numerous challenges such as:

“limited and inadequate instructional technology tools and facilities” (Interviewee 3 voice, 2020).

Similarly, respondent four and five replied that ICT has brought great changes on the performance of students and that it has also supported them in teaching, they indicated that:

“There are no internet outlets in the lecture rooms. Also, in most cases the school Wi-Fi does not function”
(Interviewee 4 voice, 2020).

“Yes, GES provided free Wi-Fi to the school but the Wi-Fi does not function always and also problems

of unreliable communication connectivity/network access’’

(Interviewee 5 voice, 2020).

Respondent 2 shared:

“With the Ghana Government supply of laptops, computers and multi-media centre-ICT laboratory to the college of education, the stage was ideally set for use of instructional technology by the tutors in their teaching. However, lack of internet connectivity in the college especially in the lecture rooms has stifled the process’’ (Interviewee 2 voice, 2020).

Finally, respondent 4 said:

“A tutor who want to access the technology fully has to do part of the lesson in the lecture room and move the students at another time to the laboratory to complete the lesson. Indeed, there are logistical constraints’’ (Interviewee 4 voice, 2020).

The Accra College of Education in Ghana, despite its evident importance and obvious need for instructional technology, was found to have significant obstacles to its usage in an interview. The interview revealed that there are no internet outlets in the lecture halls; the College's Wi-Fi does not always work; and there is a poor electricity supply at the school.

In conclusion, with the exception of the challenge on ‘lack of internet outlets in all lecture rooms, inadequate computer peripherals and problems of unreliable communication connectivity/network access.’ which was revealed through the interview responses, all other constraints were equally established

from the analysis of the questionnaire responses. The interview conducted therefore confirmed what was found by the tutors who responded to the questionnaire. Onwuagboke, Singh, and Onwuagboke (2014) found that instructors were unable to utilize instructional technology in the classroom because of a lack of internet access, insufficient computer peripherals, and challenges with unstable communication connectivity/network access.

As stated by Arikpo, Osofisan and Usoro (2009) in their study, the lack of internet connectivity in Nigerian colleges, as well as the lack of electricity and TPACK required for teaching with technologies invariably robs colleges of instructional technology enriched teaching and learning. This finding supports their conclusion.

Chapter Summary

This chapter analyses the responses from participants and interviewees on the kinds of instructional technology mainly used by tutors in Accra College of Education to support teaching, instructional technology utilisation patterns of tutors', and challenges faced by tutors in using instructional technology to support teaching.

As vital as instructional technology integration in teaching and learning is, there are several obstacles at the Accra College of Education that prevent it from being used effectively. There are several reasons for this, including a lack of consistent power/electricity supply, issues with connectivity/network access, and a lack of suitable computer equipment, such as projectors and printers, among others.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter provides an overview of the research, as well as a synopsis of the results and implications taken from those findings. Following the study's results and conclusions, suggestions are offered regarding the use of instructional technology in teaching. Other ideas for additional research are also included.

Summary of the Study

Tutors at Accra College of Education, in Ghana's Greater Accra Region, were interviewed and surveyed about their views on the use of instructional technology in the classroom. With these objectives in mind, this study was primarily focused on three areas: examining how tutors perceive instructional technology; exploring the instructional technology use patterns of tutors; and identifying the challenges that teachers face that influence their use of instructional technology.

The study reviewed relevant literature under the following sub headings: background of Accra College of Education; curriculum of college of education in Ghana; meaning and scope of instructional technology; types of instructional technologies and their usage by tutors and students; basis for technology usage in Ghana Education system; theoretical and empirical review; challenges to instructional technology usage in teaching.

A descriptive research approach was used to meet the stated goals. This study uses both a quantitative and a qualitative research style. The researcher scoured the whole faculty, including administrators. An interview

guide (Appendix B) was used to conduct a semi-structured interview with one participant each from the Administration, Education, Science/Maths, Social Science and Language departments of the College. A total of five people were chosen for the interview. In addition to the semi-structured interview schedule, a questionnaire was used to gather information from instructors. Thirty-three (33) participants responded to the questionnaire and five were selected to be interviewed.

The instruments were pre-tested at Mount Mary's College of Education in Somanya in Ghana's Eastern Region before being used in the main research. Analysis of the collected data revealed that several of the items were irrelevant or poorly organized. Afterwards, all unnecessary questions were removed, while unclear ones were reformulated. For the sum variables, the reliability estimates have been obtained. Thus, an alpha reliability of 0.74 for the Kuber Cronbach's coefficient was achieved.

The data was analyzed using SPSS version 28.0, a statistical software package for social sciences. Using frequency tables, percentages, and charts, the quantitative data acquired from the questionnaire (closed-ended questions) was analyzed. Open-ended questions and in-depth interviews were used to gather qualitative data, which was then analyzed using the following steps: The transcripts of the interviews were examined to see if any recurring themes emerged.

Key Findings

Tutors' use of instructional technology was the focus of the research. Key conclusions based on the examination of questionnaire and semi-structured interview guides may be summarized as follows:

- i. the kind of instructional technology mainly used by majority of tutors in teaching in Accra College of Education as indicated by the tutors includes: presentation software/visual aids; Microsoft PowerPoint for presentation in class; electronic whiteboards for instructions/projectors as a medium of instructions; internet/e-mail/WI-FI for research and instruction; tools such as videos, podcasts, online quizzes to support flipping the classroom teaching strategies.
- ii. majority of the tutors seldom use instructional technology to support their teaching. All the tutors either very often, often or seldomly use at-least one or the other instructional technology to support teaching. Secondly, majority of the tutors in using instructional technology to support their teaching very often use mostly computers, followed by Projectors/SMART boards and lastly Wi-Fi network for internet. Thirdly, most tutors very often/often use video/audio/CD and tape recorders.
- iii. the main challenges faced by the tutors of Accra College of Education in the Greater Accra Region of Ghana in using instructional technology as drawn from the analysis are: unreliable power/electricity supply; problems of unreliable connectivity/ network access; inadequate computer peripherals such as printers, scanners, projectors among others; attitude of tutors; and poor support from school authorities.

Conclusions

Based on the outcomes of this research, a variety of inferences might be reached. In the first place, it was observed that in spite of some challenges; some of the tutors in Accra College still integrate technology such as whiteboards/projectors; internet/e-mail/Wi-Fi; tools such as videos, podcasts in their teaching. The curriculum of Colleges of Education in Ghana has clearly made provisions for the use of technology by lecturers to support teacher trainees (pre-service teachers).

The lecturers, as part of their primary responsibility, are also to prepare pre-service teachers in Ghana on how to use instructional technology in teaching in the field after their completion. Several studies reviewed showed that the adoption and use of instructional technology by pre-service teachers can be influenced positively if their lecturers very often and effectively use instructional technology in their teaching. The use of instructional technology in teaching by newly trained teachers in most instances, all things being the same, corresponds to the extent to which their own teachers used it. The study however established that, the lecturers in Accra College of Education are faced with some challenges (classified as institutional and personal) that hinder their effective use of instructional technology in teaching.

The barriers which stalled the successful use of instructional technology in teaching by the lecturers, as this study identified, could be surmounted by procuring adequate number of computers and accessories for all lecture rooms (installation of computers, projectors and screens in all lecture rooms); attitudinal change by tutors; and effective supervision and support from school authorities. This can possibly improve the pattern of the

use of instructional technology by lecturers in teaching and thereby pushing majority of them to use instructional technology often, to support their teaching since the study revealed that most tutors of Accra College of Education, in Ghana not very often use instructional technology in their teaching.

In a nutshell, per the instructional technology utilisation pattern of the lecturers as revealed in this study, it is not surprising therefore to conclude also that, new teachers trained in this College, at the time of this study, and posted to the field are likely to emulate and be a reflection of what they experienced at college when they were students. The restricted number of freshly trained instructors who are able to effectively use instructional technology in their classrooms may arise from this.

Recommendations

The following recommendations and proposals are based on the study's results and conclusions:

1. based on the finding that unreliable power or electricity supply; unreliable connectivity/ network access; inadequate computer peripherals such as printers, scanners, projectors among others; attitude of tutors and fear of change; and poor support from school authorities are key barriers to the effective use of instructional technology in teaching, it would be prudent
2. the Government of Ghana, College authorities and all other stakeholders of colleges of education make all the needed support and financial provision to support the institution.

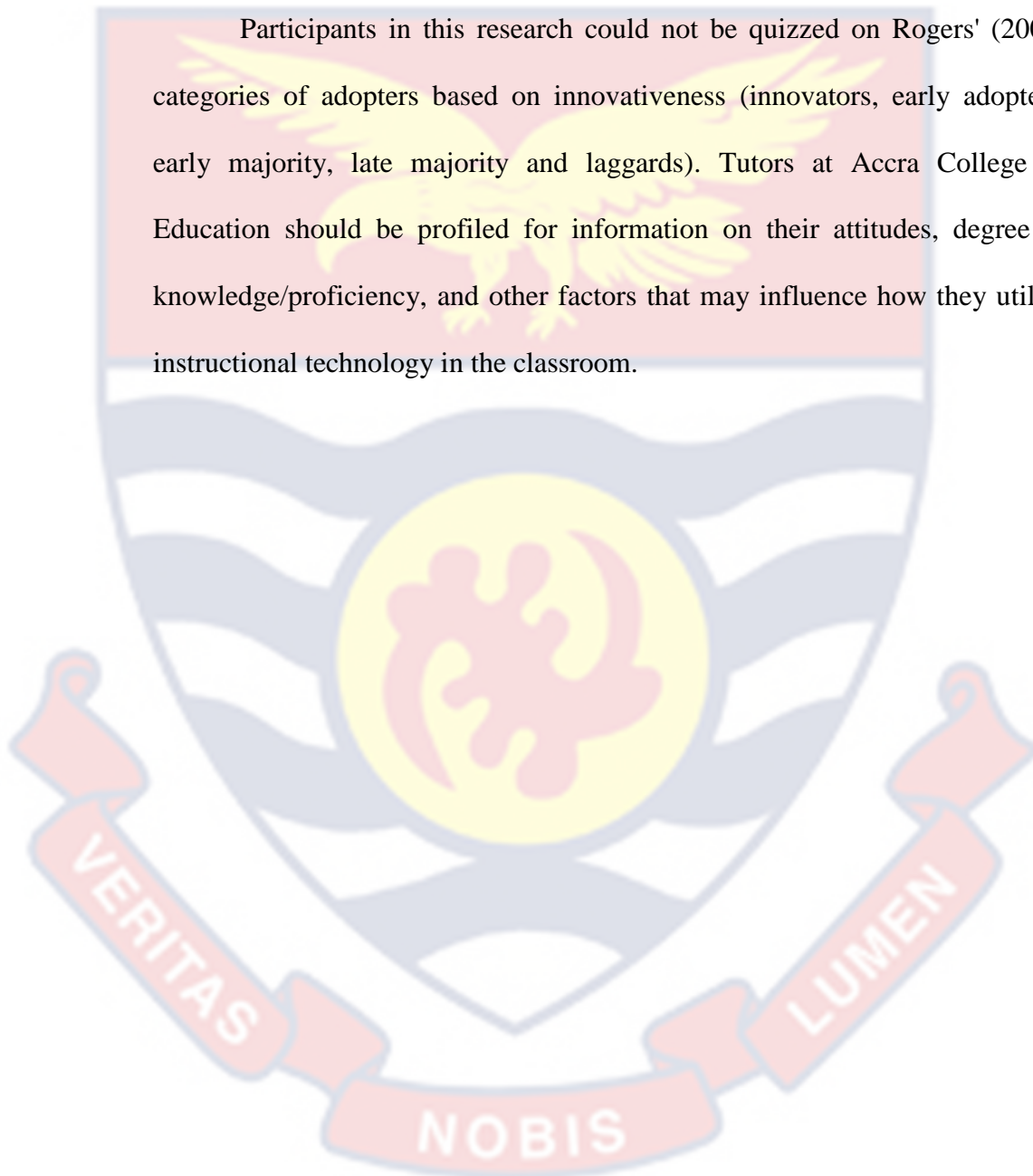
3. the school supervisors should ensure that there are regular professional development workshops in instructional technology for the staff.
4. as part of the Free Senior High School (SHS) policy in Ghana, the government has provided free Wi-Fi and internet to most SHS in Ghana. In line with that, the school authorities should make necessary arrangements so as to get the free Wi-Fi for the tutors in the College.
5. Tutors who don't have their own computers should have enough time on the college's teaching schedule to improve their computer skills. This will help them enhance their skills. The universities in Ghana that prepare teacher educators should develop courses aimed at training the tutors to be more knowledgeable about the use of instructional technology.
6. An overview of the literature shows that instructional technology is a large and diversified topic that incorporates concepts and ideas from a wide range of disciplines including cognitive psychology and management. Diffusion theories may help teachers make the most of technology in the classroom by raising awareness and expanding their usage of it. Administrators at education institutions, including Accra College of Education, should begin to research and implement the theories of innovation diffusion in order to improve the use and acceptance of instructional technology.

Suggestions for Further Studies

In light of the COVID-19 epidemic and the social distance protocol that must be respected, this research was exploratory rather than descriptive and did not attempt to modify variables in any manner. 'Only tutors'

perceptions were examined in this research. In an experimental study, it is advised to investigate the cause-and-effect links between the variables in this study. It is also recommended that similar study be conducted at other universities.

Participants in this research could not be quizzed on Rogers' (2003) categories of adopters based on innovativeness (innovators, early adopters, early majority, late majority and laggards). Tutors at Accra College of Education should be profiled for information on their attitudes, degree of knowledge/proficiency, and other factors that may influence how they utilize instructional technology in the classroom.



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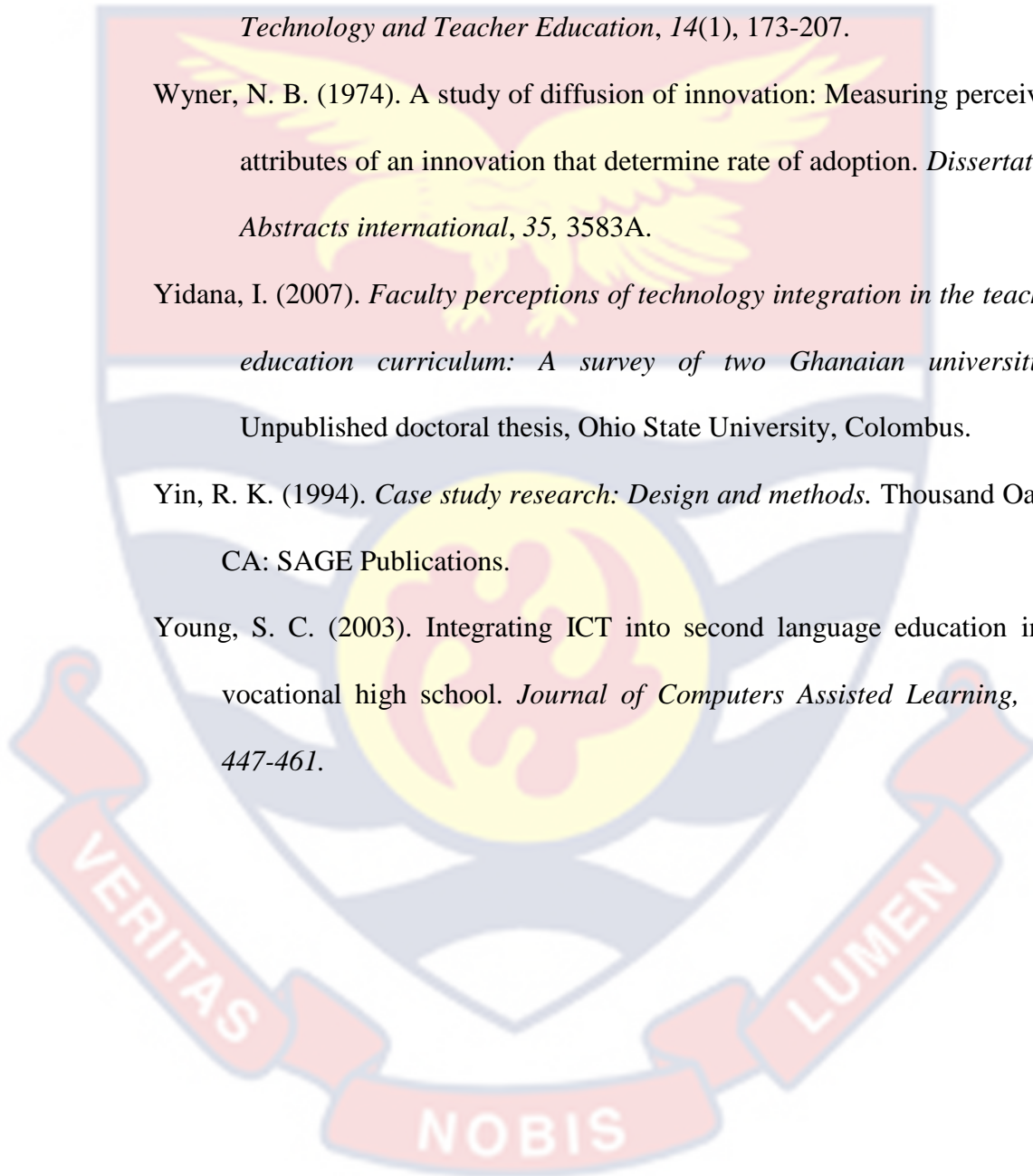
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APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST

INSTITUTE FOR EDUCATIONAL PLANNING AND
ADMINISTRATION

Questionnaire for Tutors

Teachers at Accra College of Education in Ghana's Greater Accra Region are being asked to fill out a questionnaire on their views on '**Instructional technology in teaching in Accra College of Education in the Greater Accra Region of Ghana**'. The objective of this survey is merely to gather information for research purposes. In order to get an M.PHIL, researchers must complete this course of study in order to do so. If you have any thoughts or opinions, you are encouraged to express them in the form of your answers, and you should do so in a way that accurately portrays your institution. We truly appreciate your help and cooperation. Please accept my sincere gratitude for your time and cooperation.

Section A: (Bio-data of tutors)

Instruction: Tick (✓) the appropriate box and supply information in the space provided where necessary:

- | | | |
|-----------|------------------|-----|
| (1). Age: | a. 18 - 24 years | [] |
| | b. 25 - 29 years | [] |
| | c. 30 - 34 years | [] |
| | d. 35 - 39 years | [] |

e. 40 – 45 years []

f. Over 45 []

(2). Gender:

a. Male []

b. Female []

(3). How long have you been teaching?

a. Less than 1 year []

b. 1-5 years []

c. 6-10 years []

d. 11-15 years []

e. 16-20 years []

f. 21-25 years []

f. Over 25 years []

(4). How many years have you spent in this College?

a. 1 - 4 years []

b. 5 - 9 years []

c. 10 - 14 years []

d. 15 years & above []

(5). Qualification: Choose highest degree attained:

a. Bachelor's []

b. Masters []

c. Doctorate []

Section B:

Instructions: There are four possibilities for each of the statements in Section B, and you must choose one. You must indicate your level of agreement or disagreement with the following statements by placing a tick (✓) next to them.

Kinds of instructional technologies employed by tutors. Rank on a Likert scale of 1-4.

Kinds of instructional technologies	1	2	3	4
	Strongly agree	Agree	Disagree	Strongly disagree
7. Presentation software/visual aids				
8. Web browsing and emails				
9. Microsoft Word for word-processing and instruction/Excel/Access for class work and assignment				
10. Converting a face-to-face course to an online course (via Skype, blogs, twitter etc.)				
11. Microsoft PowerPoint for presentation in class and seminars				
12. SPSS for data analysis in class and research work.				
13. Internet/E-Mail for research and instruction/WIFI				

14. The use of Subject-based instructional software				
Computers to store data and records				
15. Teaching with tablet computers				
16. Using electronic whiteboards for group instructions/projectors as a medium of instructions				
17. Teaching on school servers for students				
18. Video conferencing via skype or Google hangouts				
19. Flipping the classroom (using tools such as videos, podcasts, online quizzes)				
20. iPad/mobile devices/tablets/Televisions				
21. Recordings on CD's/DVD's/3D models				
22. Virtual field trips/internets				
23. Classroom response system. Using electronic devices that allow students to record their answers to multiple choice questions				
24. Online projects and collaboration tools				

25. Information visualization tools for transforming words into pictures				
26. Games				

27. How do you get access to teaching and research software for use? (tick as many that applies)

- a. Provided by the college
- b. Personally purchased
- c. Donated by philanthropists

Others (please specify).....

Section C: Instructional technology usage patterns of tutors’.

Instructions: Please kindly tick (✓) the appropriate response to each item. The purpose of the following questions is to gather information about the tutor’s adoption and use of computer and instructional technology in teaching. Please select the response that best represents your experience, opinion or situation.

28. How often do you use computers for professional work?

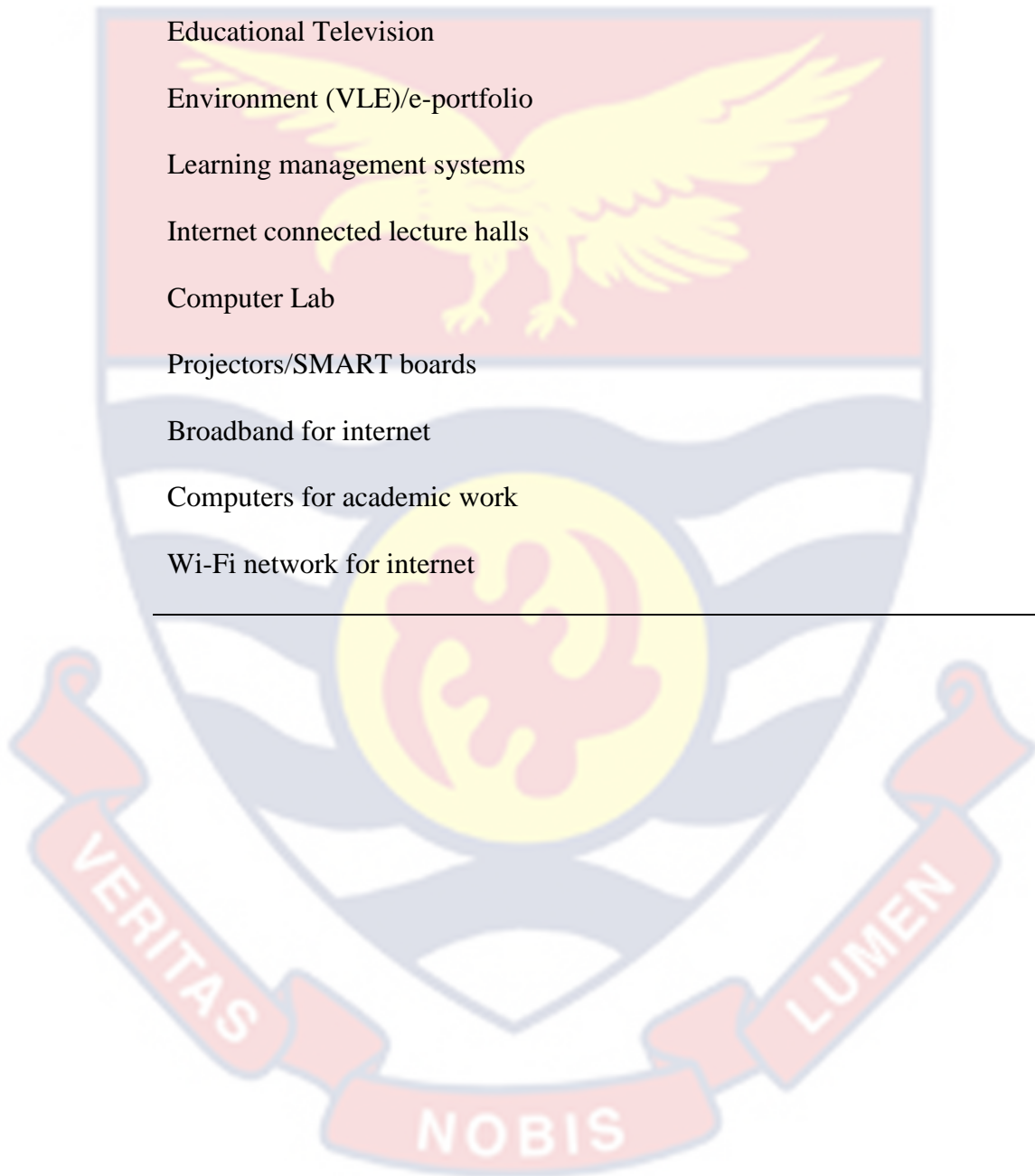
- a. Very Often
- b. Often
- c. Seldom
- d. Never

29. How do you generally assess your usage of instructional technology to support teaching?

- a. Very good
- b. Good
- c. Fair
- d. Bad
- e. Very bad

30. Please kindly tick (✓) the appropriate response to each item on tutor’s utilization of instructional technology

Instructional tech.	Very often	Often	Seldom	Never
Video and Tape recorders				
Educational Television				
Environment (VLE)/e-portfolio				
Learning management systems				
Internet connected lecture halls				
Computer Lab				
Projectors/SMART boards				
Broadband for internet				
Computers for academic work				
Wi-Fi network for internet				

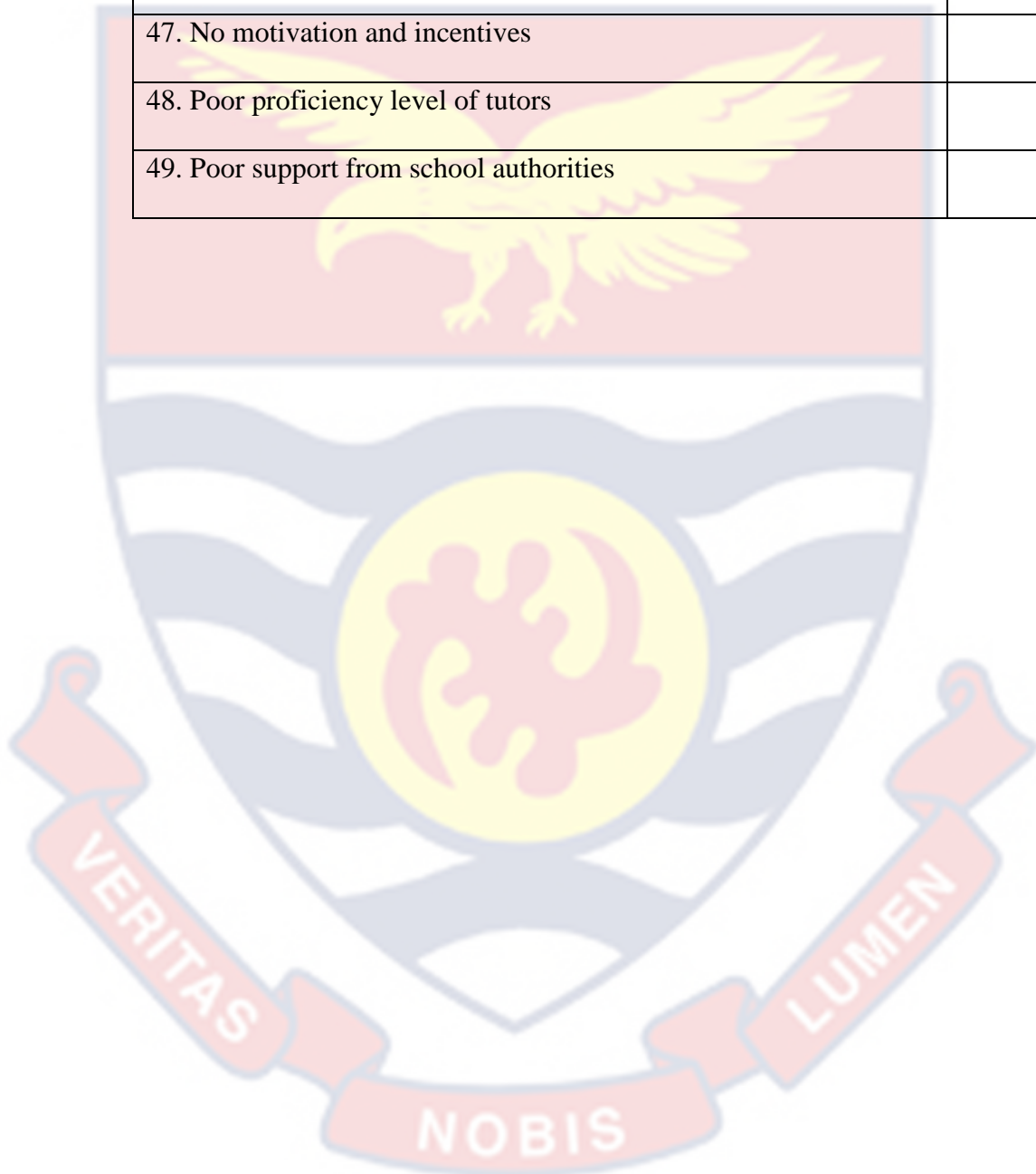


Section D: challenges faced by tutors in using instructional technology to support teaching

Instructions: please kindly tick (√) the appropriate response to each item (as many that applies to you).

Challenges	tick (√)
31. Unreliable power/electricity supply	
32. Heavy load of individual teachers	
33. Insufficient professional development and capacity building leading to bad instructional methods	
34. Difficult to experiment with computer applications	
35. Inability to cope with computer complexities	
36. Inadequate training to support use	
37. Inadequate technical support	
38. Computer technology is irrelevant to the course I teach	
39. Problems of unreliable telecommunication connectivity/network access	
40. Inadequate college financial support to develop instructional materials and visual aids	
41. Present curriculum makes no provision for instructional technology for classroom teaching	
42. Inadequate computer peripherals such as printers, scanners and projectors for effective use for teaching	
43. Accessibility of the computer in the classroom is limited.	

44. Many teaching staff members are not sure of how to use computer technology in the classroom	
45. Lack of time scheduled on school time table	
46. Attitude and fear of change	
47. No motivation and incentives	
48. Poor proficiency level of tutors	
49. Poor support from school authorities	



THE END, THANKS

APPENDIX B

UNIVERSITY OF CAPE COAST

INSTITUTE FOR EDUCATIONAL PLANNING AND ADMINISTRATION

INTERVIEW GUIDE

Tutors at Accra College of Education are the intended audience for this interview. We are conducting a survey of Accra College of Education faculty members' views on the **use of instructional technology in the classroom in Ghana's Greater Accra Region** for this interview. The objective of this survey is merely to gather information for research purposes. In order to get an M.PHIL, researchers must complete this course of study in order to do so. Please accept my sincere appreciation for your openness in responding to the following inquiries. Please be assured that the information you provide will remain strictly private and anonymous.

1. Do you have a computer lab? Yes [] No []

2. If Yes, how helpful is it to you?

.....

.....

.....

3. If No what problems exist.....

.....

.....

4. Do tutors normally use instructional technology to support teaching?

Yes [] No []

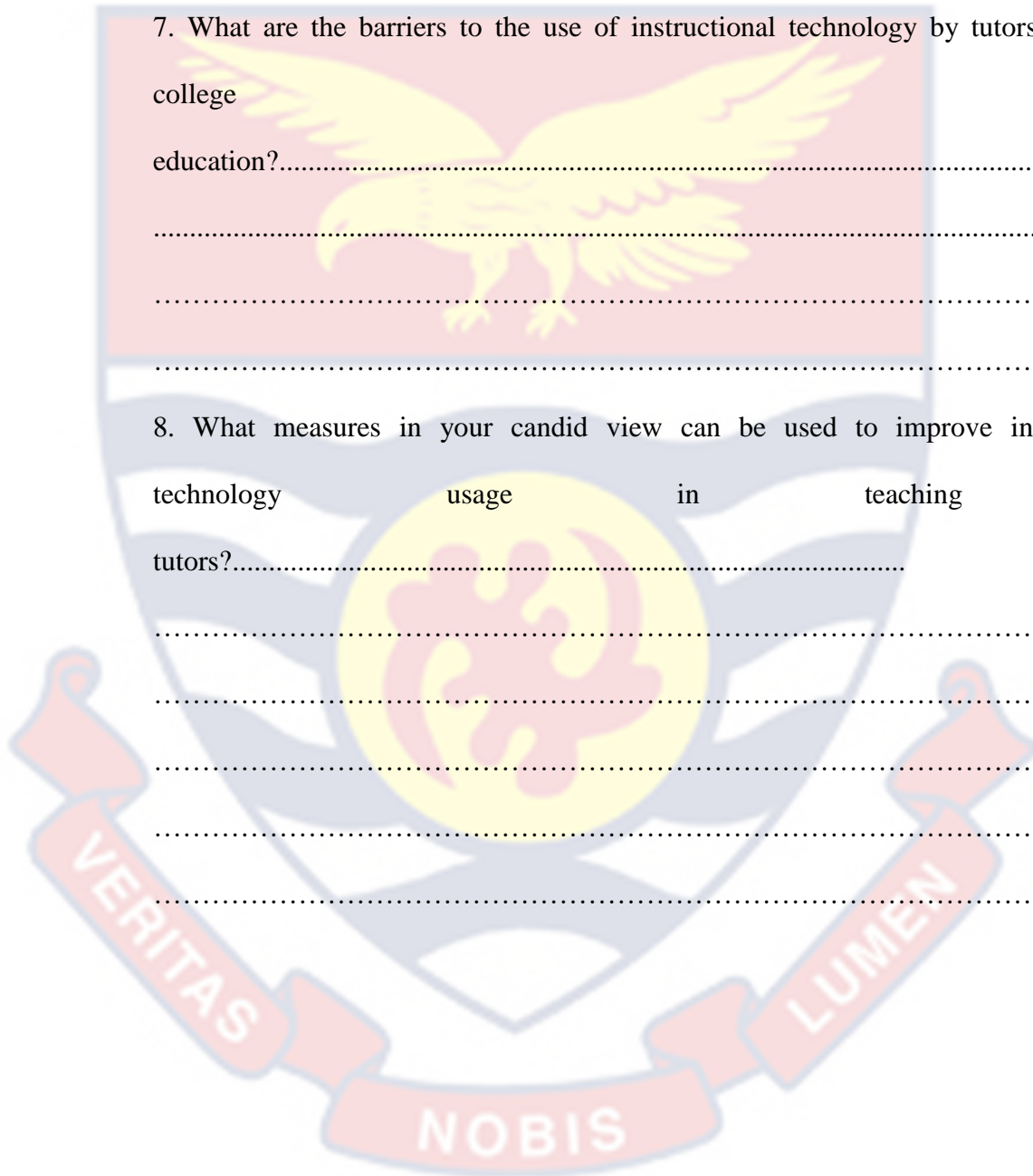
5. If Yes, please specify the kind?

.....

.....
6. If No can you give some reasons.....
.....
.....

7. What are the barriers to the use of instructional technology by tutors of Accra college of education?.....
.....
.....
.....

8. What measures in your candid view can be used to improve instructional technology usage in teaching by tutors?.....
.....
.....
.....
.....
.....
.....
.....



APPENDIX C

UNIVERSITY OF CAPE COAST

INSTITUTE FOR EDUCATIONAL PLANNING AND ADMINISTRATION

Consent for Participation in Interview Research

In order to help Ms. Victoria Yeboah from the University of Cape Coast, I am willing to join in her research project. According to what I've read, the goal of the study is to learn what respondents think about **the use of instructional technology in the classroom at Ghana's Accra College of Education**. For this study, I will be one of persons to be interviewed.

First and foremost, I'm doing this endeavor on my own time. There will be no compensation for my participation in this event. My participation in this program is voluntary and I have the option of withdrawing at any time. Nobody on my campus will know if I refuse to participate or withdraw from the research. It is my right to reject to answer any questions or to terminate the interview if I feel uncomfortable at any time throughout the interview session.

The researcher from the University of Cape Coast is conducting a focus group discussion in which participants are asked to participate. About 10-15 minutes are allotted for the interview. During the interview, the interviewer will take notes. The interview and following discourse will be recorded on audiotape. To participate in the research,

1. I must agree to be recorded.
2. I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and

data will be subject to standard data use policies which protect the anonymity of individuals and institutions.

3. There will be no members of my school's administration or departments present during the interview nor will they be able to see any raw notes or transcripts. By taking this measure, I'm hoping to avoid any unintended consequences from my remarks.

4. I'm aware that the school officials have given their consent to this research project. I'd be happy to get further information from you.

5. I've read and fully comprehended the information given to me. I'm satisfied. I feel that all of my concerns have been addressed, and as a result, I am willing to take part in this research at this time.

6. I have been given a copy of this consent form.

In lieu of the above reasons, I Agree / Disagree to participate in the interview (underline which is applicable).

Name(participant).....

Signature.....

Date

Name and contact of the Investigator:

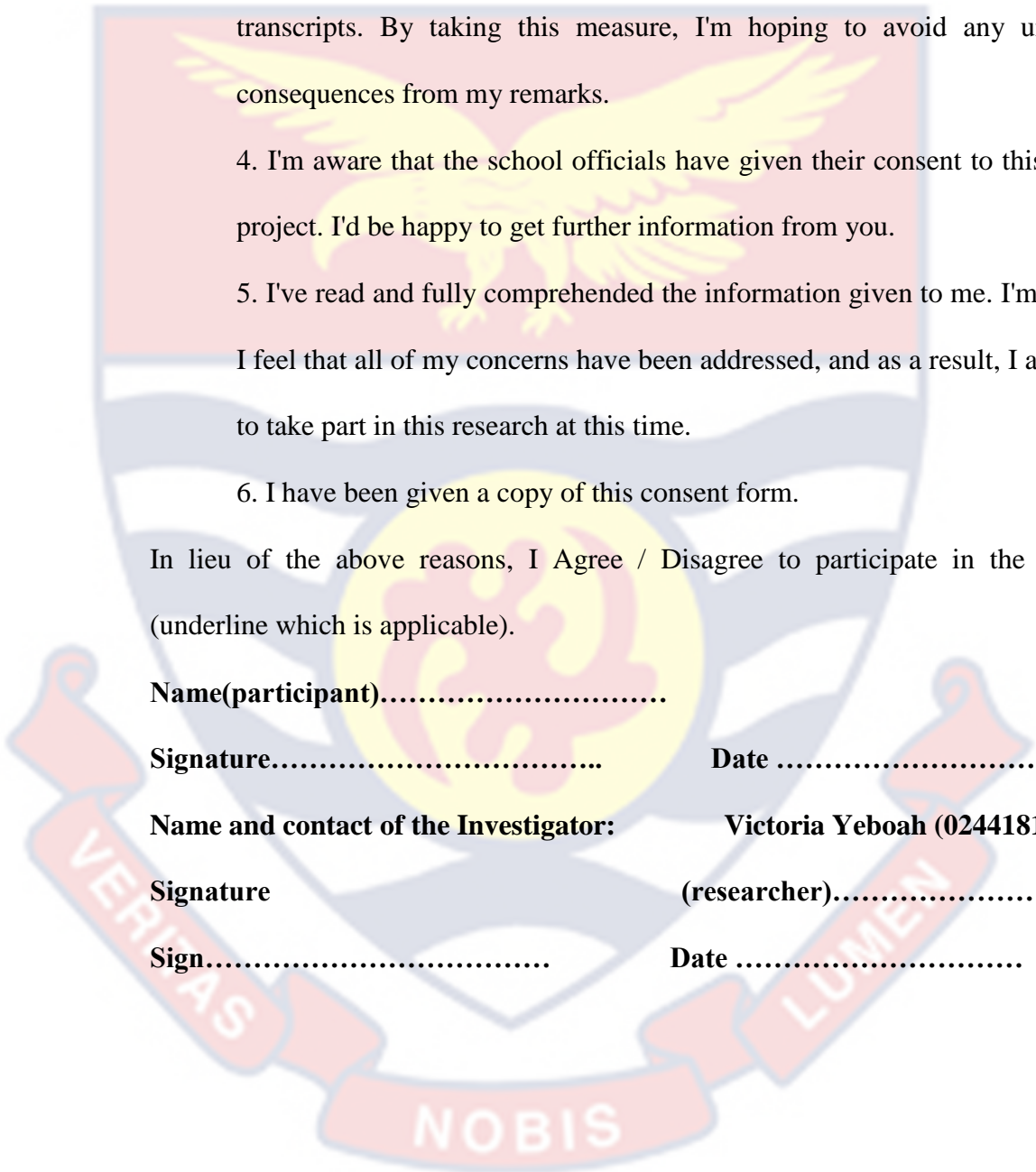
Victoria Yeboah (0244181356)

Signature

(researcher).....

Sign.....

Date



APPENDIX: D

UNIVERSITY OF CAPE COAST

INSTITUTE FOR EDUCATIONAL PLANNING AND ADMINISTRATION

Research Consent Form for Tutors Questionnaire

Topic: The use of Instructional Technology in teaching in Accra College of Education in the Greater Accra Region of Ghana.

Thank you for providing the participants' information sheet and questionnaire with this information about my project.

According to the researcher's answers, I've been able to ask any queries I may have had concerning this study.

There will be no penalties for me if I decide to drop out of the project at any point, and I understand that my involvement is optional. If I ever want to stop participating in this research, I realize that I can.

As part of the inquiry, I also understand that any information captured, in any form, will remain secret and will not be released to the public.

Consenting to my data being used as described in the participant information page is my full agreement. For this project, I agree to being photographed, filmed, or recorded in any way possible. **I agree / I don't agree** to participate in the research (underline as relevant).....

.....

1. (Name of Participant) (Date) (Signature)

.....

.....

2. (Name of Researcher) (Date) (Signature)

APPENDIX: E

LETTER OF INTRODUCTION FROM IEPA



UNIVERSITY OF CAPE COAST
INSTITUTE FOR EDUCATIONAL PLANNING AND ADMINISTRATION

Tel. No.: 03320-91478
Tel. No. : 03321-30571
Fax No. : 03321-30588
E-mail : iepa@ucc.edu.gh

University Post Office
Cape Coast
Ghana

August 13, 2020.

Our Ref.: ED/AHP/15/169

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.....
.....

Dear Sir/Madam,

LETTER OF INTRODUCTION

The bearer of this letter **Ms Victoria Yeboah (EO/EAT/19/001)** is an M.Phil student studying at the Institute for Educational Planning and Administration (IEPA) at the University of Cape Coast. She requires some information from you/your outfit for the purpose of writing her thesis titled, **"Instructional Technology in Teaching in Accra College Education"** as a requirement for her M.Phil Programme.

Kindly give the necessary assistance that **Ms. Yeboah** requires to enable her gather the information she needs.

While anticipating your co-operation, we thank you for any help that you may be able to give her.

Thank you.

Yours faithfully,

Alberta A. K. Owusu (Mrs.)
ASSISTANT REGISTRAR
For: **DIRECTOR**

APPENDIX: F

LETTER OF INTRODUCTION FROM GES

GHANA EDUCATION SERVICE

SHAI OSUDOKU

P. O. BOX DD 45

DODOWA

AUGUST 13TH 2020

THE PRINCIPAL
MT. MARY COLLEGE OF EDUCATION
SOMANYA

Dear Principal,

REQUEST FOR PILOT TESTING

I am a final year M.Phil. student of the Institute of Educational Planning and Administration (IEPA) at the University of Cape Coast.

I wish to undertake a pilot study at your school to enable me test for the reliability of my questionnaire in fulfilment of my research topic on “Instructional Technology in Teaching in Accra College of Education”. As a requirement of the M.Phil. programme, I would need about twenty (20) participants which includes, staff and students for the pilot test.

I would be very grateful if you could offer me the needed assistance and grant me my request.

Please find attached a copy of my introduction letter to Accra College of Education.

Thank you and counting on your usual cooperation.

Yours Faithfully



Victoria Yeboah

(STUDENT ID – EO/EAT/19/001

0244181356 / 0208163074

APPENDIX: G

THE RESULTS OF THE RELIABILITY TEST

Reliability Statistics Summary (Tutors' questionnaire), Scale: All variables

Number of items Cronbach α

43 0.7426

(Source: Data gathered from pre-test. 2020)

1. Item Analysis (Section B):

Kinds of instructional technology		Mean	Std. Deviation	$\alpha=0.7842$
1.	B1	3.9231	1.5525	
2.	B2	4.0000	1.0000	
3.	B3	3.8462	1.2142	
4.	B4	3.9432	1.2810	
5.	B5	4.0000	0.9129	
6.	B6	3.3846	1.2609	
7.	B7	3.5385	1.3205	
8.	B8	3.6923	1.2506	
9.	B9	4.0000	1.0801	
10.	B10	3.7692	1.3009	
11.	B11	3.7692	1.0919	
12.	B12	4.0000	0.7071	
13.	B13	3.1538	1.5191	
14.	B14	3.0000	1.4720	
15.	B15	3.1538	1.5191	
16.	B16	3.0000	1.4720	
17.	B17	3.5315	1.4500	
18.	B18	4.0000	1.0000	
19.	B19	4.0769	0.6405	
20.	B20	3.4615	0.7763	

(Source: Data gathered from pre-test. 2020)

2. Item Analysis (Section C):

Usage pattern	Mean	Std. Deviation	$\alpha=0.8413$
21. C1	3.6667	1.2369	
22. C2	3.7500	1.1382	
23. C3	3.1667	1.0299	
24. C4	3.0833	0.9962	

(Source: Data gathered from pre-test. 2020)

2. Item Analysis (Section D):

Challenges	Mean	Std. Deviation	$\alpha=0.7931$
25. D1	2.7500	0.9653	
26. D2	3.3333	0.8876	
27. D3	2.9167	0.7930	
28. D4	3.1667	1.1934	
29. D5	3.5000	1.0871	
30. D6	3.0833	0.9003	
31. D7	3.0000	0.9535	
32. D8	2.9167	0.9003	
33. D9	3.4167	1.1645	
34. D10	3.1667	1.1934	
35. D11	4.0000	0.8528	
36. D12	4.5455	0.5222	
37. D13	3.3636	0.8090	
38. D14	3.6364	1.3618	
39. D15	3.1538	1.5191	
40. D16	3.7273	1.0090	
41. D17	3.2727	1.1.201	
42. D18	3.0909	1.3003	
43. D19	3.6364	1.2863	

(Source: Data gathered from pre-test. 2020)

APPENDIX: H

RESEARCH VISIT LETTER

21st Sept., 2020

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.....
.....

Dear Sir or Madam,

RESEARCH VISIT LETTER

I am an M.Phil. student currently at the University of Cape Coast, Department of Educational Development and Outreach, and am conducting a research at **Accra College of Education in Ghana's Greater Accra Region about their perspectives on the use of instructional technology in the classroom.** My request is for your assistance in obtaining information.

I am as well attaching an introductory letter from my academic department for your perusal please. You may contact me on 0244181356 or e.mail: vyeboah4@gmail.com

Sincerely,

Victoria Yeboah

0244181356

School of Educational Development and Outreach-
University of Cape Coast

APPENDIX: I**PARTICIPANT INFORMATION SHEET (PIS)****1. Research Project Title**

Instructional technology in teaching in Accra College of Education in the Greater Accra Region of Ghana

2. Invitation

You've been asked to participate in this study, and we hope you will. It's crucial to know why the study is being done and what it entails before you decide to do so. If you have any questions or concerns, please feel free to reach out to us. Please let me know if anything is unclear or if you want further details. Don't rush into making a decision about whether or not you want to participate. Thank you for your time.

3. What is the project's purpose?

Tutors at Accra College of Education in Ghana will be the focus of this study, which intends to examine their usage of instructional technology. In order to make comparisons with prior results, this study is based on earlier research by the researcher and that of others.

4. Why have I been chosen?

Because of your experience as an instructor, administrator, or someone in a related function at your institution, you have been selected to participate in this project.

5. Do I have to take part?

You have the option of participating or not. This permission form and a copy of the information sheet are available to you if you want to participate.

6. What will happen to me if I take part?

If you accept our invitation, you will be required to fill out a 15-minute online questionnaire or interview. Additionally, you may be interested in having another conversation with me regarding your strategy.

7. What do I have to do?

Please complete the interview/questionnaire. Participation does not include any further responsibilities or constraints on one's personal life.

8. What are the possible disadvantages and risks of taking part?

Taking part in the study isn't expected to give you any negative consequences or pain. Physical and/or mental injury or anguish will be just like that which is experienced on a regular basis.

9. What are the possible benefits of taking part?

Despite the lack of immediate rewards for individuals involved in the study, it is believed that this effort will have a positive influence on the usage of instructional technology by tutors. Participants will be given access to the findings so that they may use them in their professional endeavors.

10. What happens if the research study stops earlier than expected?

I will notify you if the study is halted sooner than expected and I will explain why.

11. What if something goes wrong?

In the first place, if you have any issues with the project, you may get in touch with me. You may contact the University of Cape Coast, Ghana, if you believe your issue has not been addressed to your satisfaction.

12. Will my taking part in this project be kept confidential?

I promise to keep any and all information I get about you over the course of my study completely secret. In no way, shape, or form, will anybody be able

to find out who you are. No one will be able to tell who you work for or where you go to school. Passwords and other applicable security measures will be used to secure any personal information you provide in the questionnaire/interview. In order to facilitate reuse by the researcher and other parties, the data gathered may be made available in an anonymised form. There will be no way for someone to be recognized or tracked down using these anonymised datasets.

13. Will I be filmed, and how will the footage be used?

Additional than your responses to the survey/interview questions, no other information about you will be gathered.

14. In order to accomplish the research project's goals, what kind of information would be requested from me and why?

You will be asked about your thoughts and present practices in the questionnaire. The initiative wants to know what you have to say about the subject matter.

15. When the research endeavor is over, what will happen to its findings?

The study's findings will be released in a book or other kind of media. No one will know who you are if your name appears in anything. Please let me know if you'd want a copy of any reports that were generated as a consequence of the study.

16. Who is organizing and funding the research?
The project is fully funded by the researcher

17. Who has ethically reviewed the project?

This project has been ethically approved by the University of Cape-Coast

18. Contacts for further information

Tel. 0244181356/0594447550. email: vyeboah4@gmail.com

Thank you for taking part in this research.

