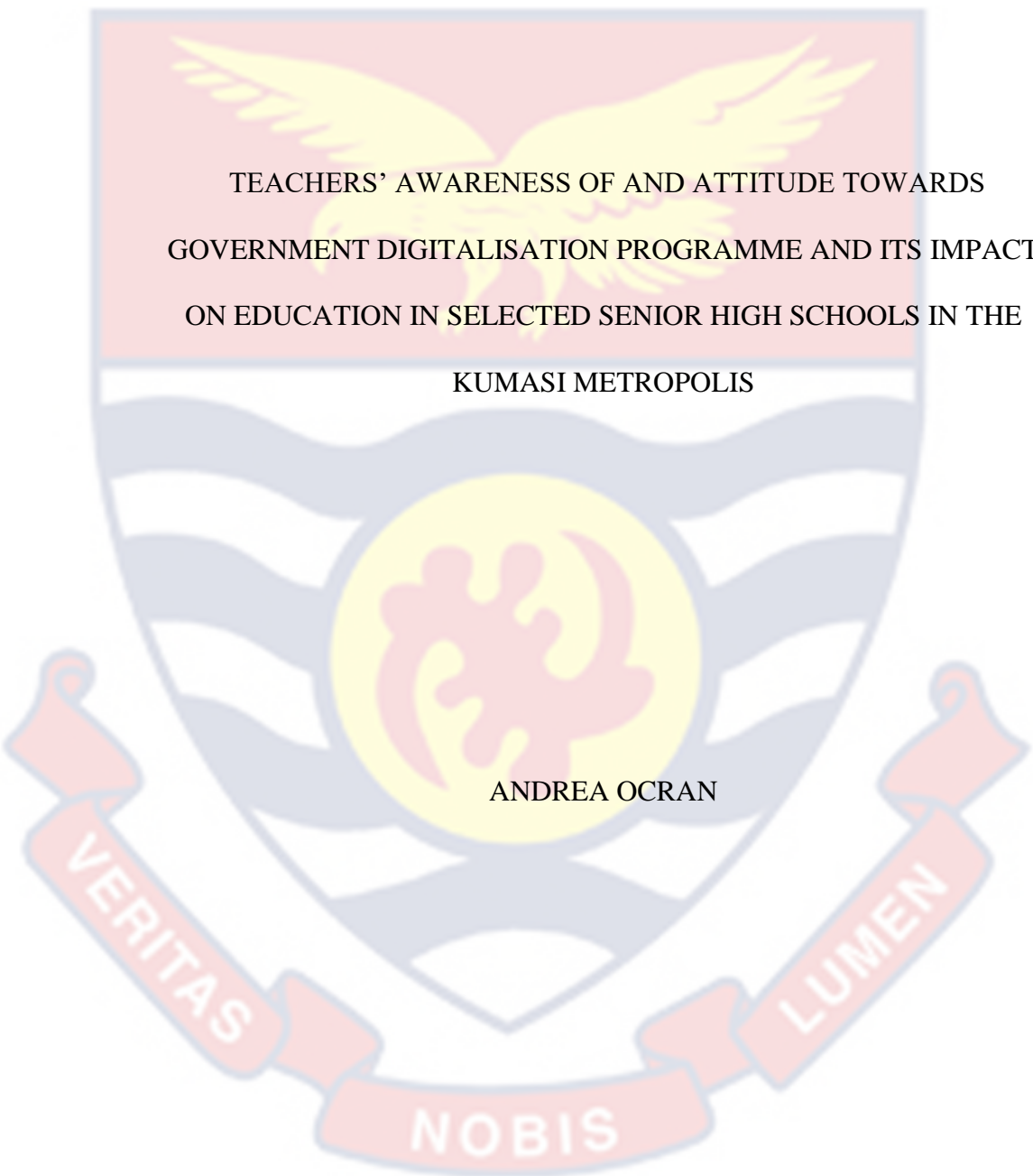


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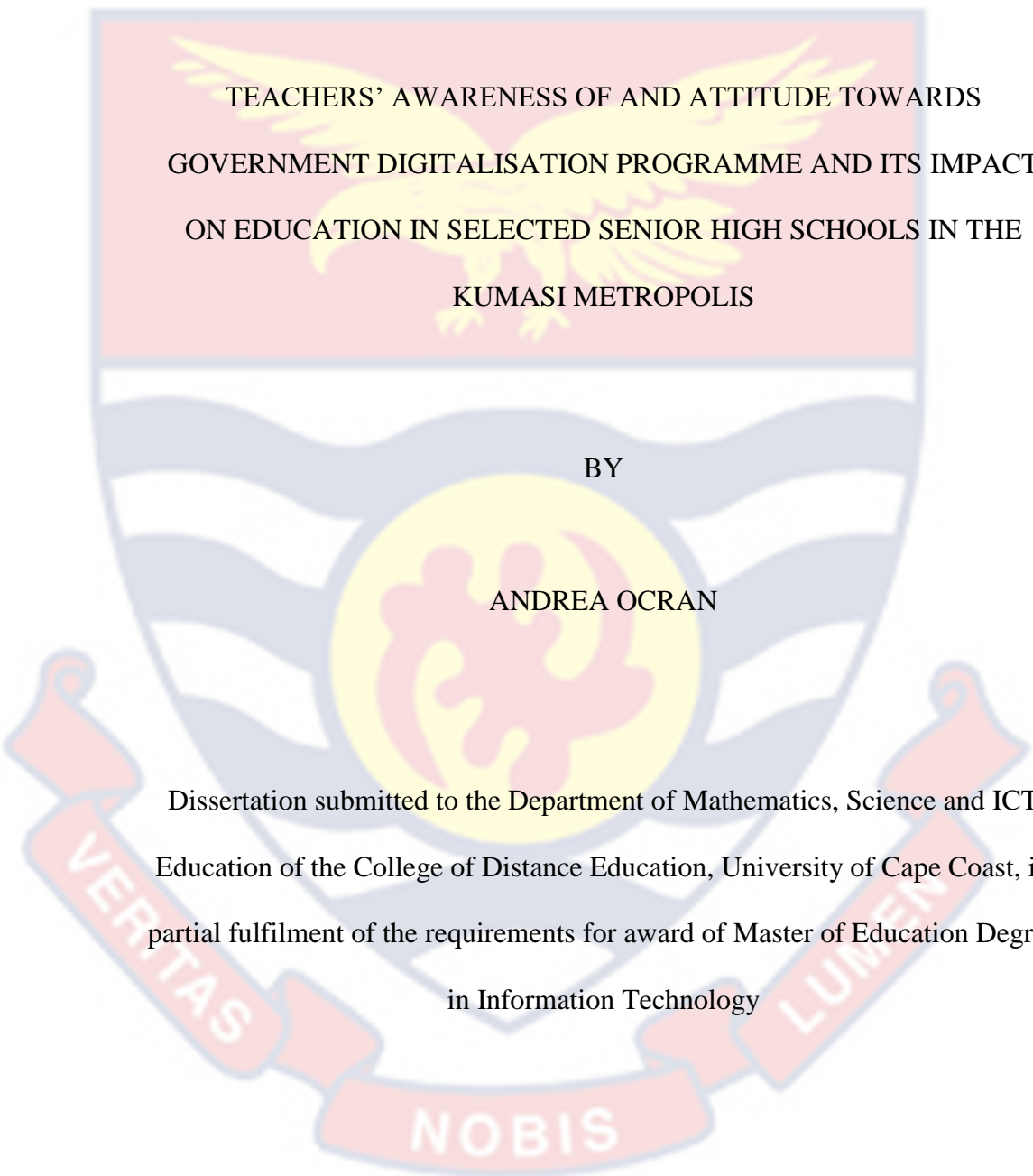


TEACHERS' AWARENESS OF AND ATTITUDE TOWARDS
GOVERNMENT DIGITALISATION PROGRAMME AND ITS IMPACT
ON EDUCATION IN SELECTED SENIOR HIGH SCHOOLS IN THE
KUMASI METROPOLIS

ANDREA OCRAN

2023

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The background of the page features a large, faint watermark of the University of Cape Coast crest. The crest is a shield with a red top section containing a yellow eagle with wings spread. Below the eagle is a white section with blue wavy lines. The bottom section is red and contains a yellow circle with a red figure. A red ribbon at the bottom of the shield contains the Latin motto 'VERITAS NOBIS LUMEN'.

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KUMASI METROPOLIS

BY

ANDREA OCRAN

Dissertation submitted to the Department of Mathematics, Science and ICT
Education of the College of Distance Education, University of Cape Coast, in
partial fulfilment of the requirements for award of Master of Education Degree
in Information Technology

APRIL 2023

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation 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:

Name: Andrea Ocran

Supervisor's Declaration

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

Supervisor's Signature:Date:

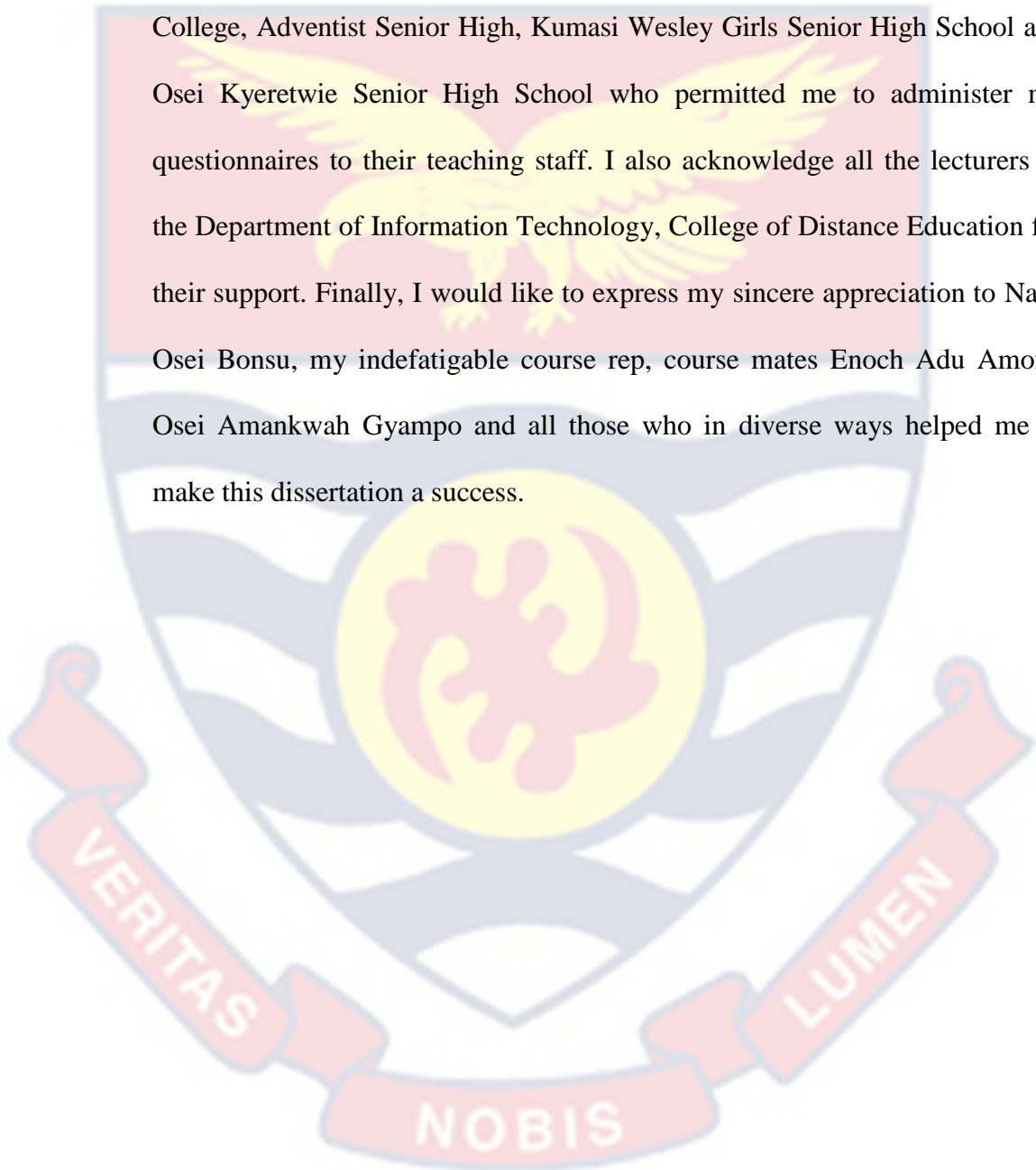
Name: Dr. Emmanuel Arthur-Nyarko

ABSTRACT

The prime purpose of this study was to examine teachers' awareness of and attitude towards government digitalisation programmes and its impact on education in selected senior high schools in the Kumasi Metropolis. The descriptive survey research design was used for this study. The study utilised simple random sampling to select 260 respondents for the study. The instrument used to collect data was questionnaire, and the data collected were analysed using mean, standard deviation, mean of means, Pearson product moment correlation and linear regression. The results of the study revealed that teachers at senior high schools in the Kumasi Metro were aware of government digitalisation programmes. The findings also showed that teachers have positive attitude towards government digitalisation programmes. Furthermore, the outcome of the study found that teachers use various government digitalisation programmes. Concerning the findings from the hypotheses, it was revealed that teachers' level of awareness predicted teachers' attitude towards digitalisation programmes. Additionally, the study showed that teachers' attitude towards digitisation predicted their level of use of digitalisation programmes. The study, therefore, recommended that government of Ghana should extend their digitalisation agenda to the education sector. It was also recommended that the management of Ghana education service should take into cognizance the awareness level and attitude of teachers when implementing digitalised technology for education.

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My thoughtful appreciation goes to my supervisor, Dr Emmanuel Arthur-Nyarko, whose supervision, direction and care led to the completion of this work. Thanks to the management of Asanteman Senior High School, Prempeh College, Adventist Senior High, Kumasi Wesley Girls Senior High School and Osei Kyeretwie Senior High School who permitted me to administer my questionnaires to their teaching staff. I also acknowledge all the lecturers of the Department of Information Technology, College of Distance Education for their support. Finally, I would like to express my sincere appreciation to Nana Osei Bonsu, my indefatigable course rep, course mates Enoch Adu Amofa, Osei Amankwah Gyampo and all those who in diverse ways helped me to make this dissertation a success.



DEDICATION

I dedicate this work to my family and friends



TABLE OF CONTENTS

	Page
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER ONE: INTRODUCTION	1
Introduction	1
Background to the Study	1
Statement of the Problem	2
Purpose of the Study	4
Research Questions	4
Significance of the Study	5
Delimitation	6
Limitations	6
Organisation of the Study	7
CHAPTER TWO: LITERATURE REVIEW	8
Introduction	8
Theoretical Framework	19
Diffusion of Innovation Theory	19
Conceptual Review	8
The Concept of Assessment	14
Digitalisation Vs Digitisation	15

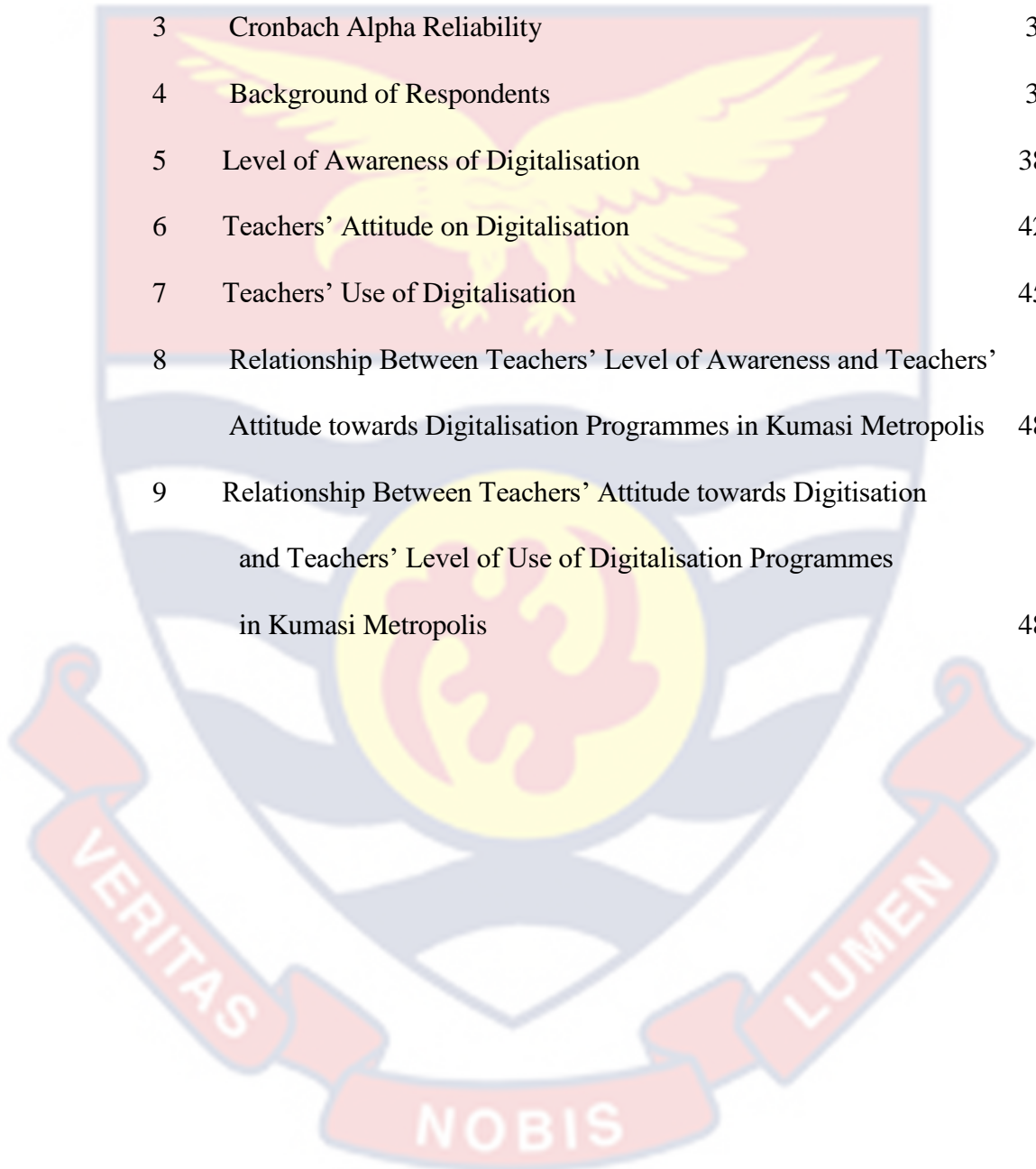
Government of Ghana’s Digitalisation Programmes	16
Digitalisation in Education	16
Digitalisation programmes and Policies in Ghana’s Educational System	17
Challenges Facing Digitalisation programme of Government	19
Empirical Review	25
CHAPTER THREE: RESEARCH METHODS	31
Introduction	31
Research Design	31
Study Area	31
Population	32
Sample and Sampling procedures	33
Research Instruments	33
Data Collection Procedure	34
Data Analysis	34
Research Ethics	35
CHAPTER FOUR: RESULT AND DISCUSSION	36
Introduction	36
Analysis of Data from Respondents	36
Analysis of Research Questions	36
Analysis of Research Hypotheses	52
CHAPTER FIVE: RESULT AND DISCUSSION SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	55
Introduction	55
Summary	55
Key Findings	56

Conclusions	57
Recommendations	58
Suggestion for Further Studies	59
REFERENCES	60
APPENDIX A: Questionnaire	69



LIST OF TABLES

Table	Page
1 Summary of Accessible Population	36
2 Sample Size Distribution	36
3 Cronbach Alpha Reliability	36
4 Background of Respondents	36
5 Level of Awareness of Digitalisation	38
6 Teachers' Attitude on Digitalisation	42
7 Teachers' Use of Digitalisation	45
8 Relationship Between Teachers' Level of Awareness and Teachers' Attitude towards Digitalisation Programmes in Kumasi Metropolis	48
9 Relationship Between Teachers' Attitude towards Digitisation and Teachers' Level of Use of Digitalisation Programmes in Kumasi Metropolis	48



CHAPTER ONE

INTRODUCTION

Background to the Study

Computers and information and communication technologies continue to change the way things are done. Rapid digital transformation is reshaping our global economy, evading virtually every sector and aspect of daily life, changing the way we learn, work, trade, socialize, and access public and private services and information (Bonsu, Kpodo, Arkorful & Edumadze, 2020). Digitization is a process of converting text, pictures, or sound into a digital form that can be processed by a computer (MaryAnne, 2018). In other words, “digitisation is the automation of existing manual and paper-based processes, enabled by the digital devices; from an analog to a digital format, while digitalisation refers to the use of digital technologies and of data (digitized and natively digital) in order to create revenue, improve business, replace/transform business processes (not simply digitizing them) and create an environment for digital business, whereby digital information is at the core” (Sausen, 2020).

Therefore, it could be concluded that every digitalisation or digital transformation starts with digitization. For instance, indicators of Huawei and Oxford Economics (2016) revealed that the global digital economy was worth some \$11.5 trillion, equivalent to 15.5 percent of the world’s overall Gross Domestic Product (GDP). It is expected to reach 25 percent in less than a decade, quickly outpacing the overall economy's growth. However, a country like Ghana is currently catching only a fraction of this growth and need to strategically invest in

the foundational elements of their digital economy to keep pace (The World Bank Group, 2019).

Based on this, the Government of Ghana, through the Ministry of Communications and Digitalisation is playing a key role in developing a solid framework to support the digitalisation of the Ghanaian economy in a way that captures and benefits every citizen. The Digital Ghana Agenda seeks to digitalise Government services, through the building of a biometric national identity register, deploying a digital property addressing system, mobile money interoperability and institutionalize paperless port operations, online passport application, rural connectivity program to link the unserved and underserved communities, among others and also create jobs opportunities for unemployed youth who have been trained to digitize records (National Communications Authority, 2018).

The National Communications Authority (NCA), the regulator for the electronic communications sector, has played a key role in creating the enabling environment for the ubiquitous deployment of ICTs to facilitate the digitalisation of the economy. For instance, NCA Computer Emergency Response Team, shortened as NCA-CERT (Computer Emergency Response Team) for the telecommunications sector, was established to coordinate, detect, prevent, and provide rapid response to cyber-attacks and network vulnerabilities in collaboration with industry players and CERTs in other industries. The NCA-CERT also monitors and reports incidents on critical communications infrastructure within Ghana for rapid response by appropriate institutions. A Common Platform (CP) for monitoring government revenues in the telecommunication sector was also

established through collaboration with the Ghana Revenue Authority (GRA) to provide telecom traffic monitoring, revenue assurance monitoring and mobile money monitoring. It also provides a fraud management system to combat the fraudulent termination of international traffic as local calls (SIM Box fraud) in Ghana (National Communications Authority, 2018).

In light of all these programmes and policies set aside to see to the attainment of a digital economy and a digital Ghana, the educational sector is still lacking behind in terms of digitalisation. Most schools lack basic information communication infrastructure to implement ICT in education. Again, most teachers and students lack basic ICT skills to integrate technology into teaching and learning effectively (Boadu, Awuah, Ababio & Eduaquah, 2014; Bariham, 2019).

Statement of the Problem

Many developing countries are pursuing a wide range of policies and programmes aimed at achieving digitalised economies, of which Ghana is not an exception. In the last decade, the Government of Ghana has championed the use of ICT in education for improved educational outcomes (Adu, Dube & Adjei, 2016). The Education Strategic Plans of 2003-2015 and 2010-2020, for instance, identified the need for ICT in education to help achieve the objectives which are centred on access, quality, gender and inclusiveness, and education management. Consequently, the government of Ghana developed the ICT for Accelerated Development (ICT4AD) Policy in 2003, which explicitly outlined the plans and strategies in a framework of how ICTs can be used to facilitate the national goal of “transforming Ghana into an information and knowledge-driven ICT literate

nation” (Natia & Al-hassan, 2015). The ICT4AD policy has 14 cardinal pillars, of which promoting ICT in education is the second; it emphasizes the deployment and exploitation of ICTs in education. The use of these technologies has become a necessity for quality in teaching-learning. Ghana’s government has also made efforts to catch up with these global trends by supplying computer hardware and software resources to schools.

Despite these initiatives by the Ghana government to promote effective digitalisation through ICT, these efforts have not been fully realised in the education sector since much of teaching and learning is still face-to-face rather than virtual (Natia & Al-hassan, 2015). This presupposes Ghanaian teachers are either not fully aware or understand government’s digitalisation efforts. It is therefore not surprising that most instructors in Senior High Schools lack basic computer skills, hence unable to access the wide range of online teaching learning platforms (Boadu et al., 2014). From the researcher’s observation as a high school tutor, some teachers prefer to seek the assistance of ICT teachers when it comes to issues pertaining to digitalisation. The issue is compounded by the fact that teachers lack the motivation and positive attitude needed to integrate digital tools in teaching and learning (Bariham, 2019).

The 21st century teacher has a responsibility to help promote learning preconditions such as working habits, attitudes, knowledge and motivation. Thinking through various teaching methods and assessing which possibilities they offer for learning is challenging for the teacher (Topno & Sinha, 2019). As a professional practitioner, the teachers’ is a role model or standard for their students.

Teachers are expected to become technologically oriented and responsible not only for their teaching but also for their students learning (Topno & Sinha, 2019).

Teachers are thus seen as agents of social change (Brown, White & Kelly, 2022).

The term "change agent" refers to persons who, whether within or outside of an organisation, have the ability or opportunity to successfully transform aspects of how that organisation runs (Fullan, 2011). Change agents are, therefore, individuals who can best catalyse the effective introduction of new ideas or viewpoints into a business, organisation, or establishment (Brown et al., 2022). Teachers are considered change agents in education. They are also increasingly seen as critical to the smooth administration of schools and the implementation of educational technology in the classroom (Vandeyar, 2017). This means that teachers need to be aware and use government digitalisation programmes since the successful initiation and implementation of digitalisation programmes in the school program depends strongly on the teachers' support and attitudes. Unfortunately, the efforts of the Ghanaian government in digitalising the education sector are still in its infancy stage.

Evidence suggests that teachers' attitudes and beliefs influence successful integration of digitalisation programmes into teaching (Hew & Brush, 2007; Keengwe & Onchwari, 2008). If teachers' attitudes are positive toward the use of educational technology, then they can easily provide useful insight into the adoption and integration of ICT into teaching and learning processes. This study therefore investigates teachers' awareness of and attitude towards government digitalisation programme in selected senior high schools in the Kumasi metropolis.

Purpose of the Study

The main purpose of the study was to investigate teachers' awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis.

Specifically, the study sought to:

1. assess teachers' awareness of government digitalisation programmes in the Kumasi Metropolis.
2. examine teachers' attitudes towards government digitalisation programmes in the Kumasi Metropolis.
3. assess the level of use of government digitalisation programmes of teachers in the Kumasi Metropolis.
4. find out how teachers' level of awareness affects teachers' attitude towards government digitalisation programmes in Kumasi Metropolis.
5. ascertain how teachers' attitude towards government digitisation affects teachers' level of use of digitalisation programmes in Kumasi Metropolis.

Research Questions

1. What is the level of awareness of teachers about government digitalisation programmes in the Kumasi Metropolis?
2. What is the attitude of teachers towards government digitalisation programmes in the Kumasi Metropolis?
3. What is the level of use of government digitalisation programmes of teachers in the Kumasi Metropolis?

Research Hypotheses

The following research hypotheses guided the study:

1. H_0 . There is no statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis.

H_1 . There is a statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis.

2. H_0 . There is no statistically significant relationship between teachers' attitude towards digitisation and teachers' level of use of digitalisation programmes in Kumasi Metropolis.

H_1 . There is a statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis.

Significance of the Study

This study is relevant because its results would show high school teachers' awareness of and use of government's digitalisation programmes. This would serve as a solid basis to stakeholder, policy and decision makers and advocacy work by civil society organizations to address the gaps that may exist. The study would, in the long run, add up to the existing literature.

Delimitation of the Study

The study was delimited in scope to teachers' awareness of and attitude towards government digitalisation programme and its impact on education in

selected senior high schools in the Kumasi metropolis. Additionally, the study was delimited in geography to Kumasi Metropolis.

Limitation of the Study

Using the quantitative research method has its own weaknesses. The limitations of the study are mainly about functional instruments that were used to collect data. Thus, the use of a questionnaire could elicit unwarranted or fake responses. The researcher, however, assured the respondents of their anonymity. Furthermore, the use of the questionnaire in collecting the data restricted the respondents from choosing from the available options given. This may lead to the inability of the researcher to obtain in-depth information about the problem of the study. This may also affect the authenticity of the findings.

Organisation of the Study

The study comprised five chapters. Chapter One was the introduction which discussed the background to the study, statement of the problem, purpose of the study, research questions or hypothesis, significance of the study, delimitations of the study, limitations of the study and organisation of the study. Chapter Two covered the literature review, capturing different literatures on teachers' awareness of and attitude towards government digitalisation program and its impact on education, ICT and digitalisation at large were reviewed. The third chapter discussed the methodology. It constituted research design, population, sample and sampling procedures, instrument, data collection procedure, data analysis and ethical considerations. Chapter Four provided results and discussions. Finally,

Chapter Five gave the summary, conclusions, and recommendations for the study and suggestions for further research.



CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter took into consideration relevant previous works and ideas that aligned with this study. The researcher reviewed ideas in various books and articles, that have been expressed by many scholars from different persuasions relating to digitalisation vs digitisation, digitalisation in education, digitalisation programmes and policies in Ghana's educational system and challenges facing digitalisation programmes in Africa. The theoretical framework focused on diffusion innovation theory. Finally, the empirical review was done to understand what earlier researchers have documented relating to this study.

Theoretical Framework

Diffusion of Innovation Theory

Innovation Diffusion Theory by Roger is one of the technology acceptance theories that help to understand how information system innovations spread within and among communities (Zhang, Yu, Yan & Spil, 2015). The theory makes emphasis on "diffusion" and "innovation". According to the theory, innovation is an idea, process, or technology perceived as new by its audience (Rogers & Singhal, 2003). Diffusion, on the other hand, is the process by which the information about the innovation flows from one individual to another over time within the social system (Zhang et al., 2015).

Diffusion of innovation theory espoused for main determinant of successful Information technology innovation. These are: communication channels, the

attributes of the innovation, the characteristics of the adopters, and the social system (Rogers & Singhal, 2003; Zhang et al., 2015).

Communication Channels: The communication channels are the medium through which people obtain information about the innovation and perceive its usefulness (Rogers & Singhal, 2003). It involves mass media and interpersonal communication (Zhang et al., 2015). Rogers and Singhal argued that communication channels could also be categorised as localite channels such as interpersonal communication and cosmopolite channels i.e., mass media that communicate between an individual of the social system and outside sources (2003).

Innovation: innovation is an idea, process, or technology that is perceived as new by its audience (Rogers & Singhal, 2003). According to Zhang et al. (2015), the attributes of innovation include five user-perceived qualities: relative advantage, compatibility, complexity, trialability and observability.

Relative advantage describes the extent to which an invention improves an existing technology in the eyes of the user. According to Rogers and Singhal (2003), compatibility is also defined as how well an innovation fits into the current social and technological context. This implies that the more an innovation can integrate or coexist with existing beliefs, values, past experience and the needs of potential users, the greater its prospects for diffusion and adoption. Complexity measures the degree to which an innovation is deemed to be challenging to understand, implement, or apply is measured by its complexity (Rogers & Singhal,

2003). Thus, innovation that is less complex will likely be rapidly accepted by end users.

On the other hand, trialability is an innovation's capacity to be tested without complete commitment and with little investment. (Zhang et al., 2015). An innovation with higher trialability is more likely to be adopted by individuals (Moore & Benbasat, 1991). Lastly, observability also the degree to which the benefits of an innovation are visible to potential adopters or users (Rogers & Singhal, 2003).

Characteristics of the Adopters: Rogers has also characterised the adopters of a social system into five groups based on their attitudes towards an innovation. They are innovators, early adopters, earlier majority, later majority and laggards (Rogers & Singhal, 2003). According to Rogers, innovators are the first group to adopt an innovation, and they understand and apply complex technical knowledge that is essential for spreading the innovation from outside the social system into the social system. This group represents 2.5 per cent of the population of the social system (Rogers & Singhal, 2003).

The next group, according to Rogers, is the early adopters (Rogers & Singhal, 2003; Zhang et al., 2015). This group tend to be a more integrated part of the social system than the innovators. They are well informed about the innovation, well connected with the new technologies and more economically successful (Zhang et al., 2015). They also represent 13.5per cent of the population of the social system (Rogers & Singhal, 2003). The next two groups, earlier and later majority adopters, also account for 68 per cent of the population of the social system. And

the last group which is made up of 16 per cent of the population in the social system, are the laggards. This group is the strongest resistant to the adoption of an innovation and most likely tend to become non-adopters because of their limited resources and lack of awareness or knowledge of the innovation (Zhang et al., 2015).

Social System: A social system is defined as "a group of connected units engaging in cooperative problem solving to reach a common purpose"(Rogers & Singhal, 2003). The social system serves as a perimeter around which innovations are disseminated. Further, according to Rogers, the social system's structure impacts how people feel about innovations and, as a result, how quickly they are adopted (as cited in Zhang et al., 2015).

Diffusion of innovation theory was necessary as the theoretical basis for the study since teachers who act as role models could be likened to Rogers "innovators" are the first group to adopt an innovation and they understand and apply complex technical knowledge that is essential for spreading the innovation, thus digitalisation of government programmes from outside classroom into their classrooms.

Conceptual Review

Digitalisation Vs Digitisation

Many articles, blog posts, and comments have been written about the differences between digitalisation and digitisation. At one time, the terms were used almost interchangeably (Dobrica, 2019). Digitalisation is the use of digital technologies to change a business model and operation (Sausen, 2020). Thus,

digitalisation goes beyond just digitization by leveraging digital information technology to entirely transform a business' processes evaluating, reengineering and reimagining the way you do business (Sausen, 2020). Digitalisation has been identified as the most significant technology trend changing society and business (Leviäkangas, 2016). Currently, firms and industries are constantly moving towards digital technology usage. On the other hand, digitisation refers to “the action or process of digitizing; the conversion of analogue data such as images, video, and text into digital form (Parviainen et al., 2017). It involves analogue-to-digital conversion of existing data and documents. For instance, scanning a photograph or converting a paper report to a PDF. The data itself is not changed; it has simply been encoded in a digital format (Sausen, 2020).

Digitalisation has three distinct phases-the initial phase is when single operations or processes are automated (such as library purchasing); the mid-phase is when related processes are automated and joined together (such as library collection management or supply chain management); and the third, most complex phase is when multiple systems that support business processes and information flows are integrated into library management systems or enterprise management systems (Savić, 2019).

Government of Ghana's Digitalisation Programmes

The Government, under president Akufo Addo, has adopted digitalisation drive Ghana's development. The country has seen a number of programs designed to develop a more digitally accessible public sector and encourage transparency and efficiency. among such programmes include travel card for government officials,

biometric national ID cards, national digital property addressing system , institutionalised paperless port operations, online passport application, mobile money interoperability , universal QR code payment system for banks and mobile wallets, wi-fi to senior high schools, digitisation of hospitals and medical records, motor insurance database, online downloading of lesson notes, digitisation of the driver and vehicle licensing authority (DVLA), digitised renewal of health insurance, digital addressing system, Ghana card, digitised passport application system, and e-gov payment, among others (Boakye, 2021). Prior to the introduction of these digitalised programmes, the erstwhile government under former president J. A. Kuffour introduced Computerised school selection placement system (CSSPS) which has been continued by the various successive government after his government.

Digital Currency

On 11 August, the Bank of Ghana announced that it had partnered with “Giesecke+Devrient” to pilot a retail central bank digital currency in Ghana. The Bank of Ghana confirmed that the digital currency, the e-cedi, is intended to complement and serve as a digital alternative to physical cash. During the pilot phase, the e-cedi will be tested with banks, payment service providers, merchants, consumers and other relevant stakeholders (Dowuona, 2021).

Government’s Digital Payment Platform

Ghana has also adopted digital payment platforms to facilitate payment for public sector services. Among this include Ghana.gov digital services and

payments platform. This platform allows payments of services to a range of Government agencies and ministries.

Additionally, all categories of taxes can now be paid remotely and electronically through the Ghana.gov platform and other automated channels. Payment of taxes can also be made through all the banks on the Ghana.gov platforms. This initiative is part of GRA's efforts to improve tax collection and remove all the inefficient challenges, such as excessively long queues, that impede payments (Dowuona, 2021; Appiah-Duku, 2022).

Also, the Ghana Ports and Harbours Authority (the "GPHA") has also introduced a new e-payment platform for the payment of charges or duties of import and export. The platform aimed to enhance cargo clearing at the ports by providing consumers with the opportunity to easily validate invoices, calculate port charges and facilitate secure transactions through mobile money and other payment systems (Dowuona, 2021; Boakye, 2021).

Digitalisation of records

The year 2021 also seen the continuation of efforts to digitize public record keeping in Ghana. For instance, the Registrar-General's Department ("RGD") has introduced online registration of business names and company registration in Ghana. Currently, entrepreneurs can sit at the comfort of their home and register their businesses and make payment through Ghana.gov payment platform (Dowuona, 2021; Boakye, 2021).

Digital Addressing System in Ghana

The Digital Addressing system (Ghana Post GPS) introduced by Dr. Bawumia has helped the government use GPS to capture every square inch of land. This initiative has aided the Land Use and Spatial Planning Authority (LUSPA) provide street names and house numbers for every street in Ghana. The Ghana Post GPS has thus helped in providing unique addresses for some 7.5 million properties (Appiah-Duku, 2022).

Mobile Money Interoperability

Mobile money interoperability offers Mobile Money customers the ability to send and receive money to all mobile money providers. The is one can send and receive money from MTN mobile money wallet to another wallet on a different network. This system is overseen by the Bank of Ghana and Ghana Interbank Payments and Settlement System (GhIPSS) (Boakye, 2021; Appiah-Duku, 2022).

Ghana Card

The Ghana Card is a national identification card that the Ghanaian government issues to all Ghanaian citizens and foreign nationals who reside in Ghana legally. The card is evidence of the holder's citizenship, identity, and place of abode. The current version is biometric and in ID1 format.

NCA - Computer Emergency Response Team

Cybersecurity incidents are prevented and handled by the Computer Emergency Response Team (CERT), also referred to as a Computer Security Incident Response Team (CSIRT). ICT vulnerabilities, criminal use, human error, and even natural calamities can all lead to cyber security events. In order to lessen the frequency and impact of incidents involving computer systems, data,

information, and services, CERTs are tasked with collecting reports, analysing incident information, collaborating with stakeholders, and providing help.

Common Platform (CP)

To verify the actual revenue that service providers receive for the purpose of calculating taxes due to the government and revenues arising from levies under the Electronic Communications (Amendment) Act 2009, the Ministry of Finance and Economic Planning, working in collaboration with the Ministry of Communications, implemented a common platform (Act 786). The KelniGVG Company offered the Common Platform. There are four (4) core subsystems of the Common Platform (National Communications Authority, 2018). These include:

1. **Traffic Monitoring** – This system is used to facilitate independent verification of government revenue on international incoming calls and to offer control information to ensure the accuracy of revenue assurance data.
2. **Revenue Assurance** – This is also used for independent assessment of all network related revenues of every telco for the purpose of calculating the Communications Services Tax (CST), Value Added Tax (VAT), National Health Insurance Levy (NHIL), as well as the 1% of revenue owed to the NCA and the Ghana Investment Fund for Electronic Communications (GIFEC).
3. **Fraud Management** – It is employed to combat SIM box fraud, which is the fraudulent termination of overseas traffic as local calls in Ghana. This entails monitoring the termination of roughly 5000 calls each day from about 57 different nations in Ghana. When these international connections end up being terminated as local calls, it proves that SIM boxes were being fraudulently used to get around

authorised international gateways. Operators get the numbers used to commit SIM box fraud so they may ban them and send information to help with SIM box geolocation.

4. Mobile Money Monitoring – This CP subsystem monitors the quantities and values of mobile money transactions in order to allow the Ghana Revenue Authority to support independent verification of earnings from mobile money transaction fees.

Digitalisation in Education

Technologies are being integrated into the teaching and learning process in many learning institutions of the world (Ertmer, 2005; Friedman & Friedman, 2009). Throughout the world, many countries, such as Ghana, have introduced digitalisation programmes and policies into schools via different courses of action. In Ghana, the Ministry of Education (MOE) has made considerable investments in technology integration in teaching and learning to achieve the goal of improving the quality of education.

Digitalisation of education rest on the use of educational technologies such as learning management system, content management system, computers, projectors, smart board, and others to complement traditional teaching and learning. Higher education in Africa currently employs LMS and computer-based assessment to complement classroom teaching (Bervell & Umar, 2017). However, in Ghana, the use of LMS in senior high schools only began during the covid-19 lockdown when schools were closed down, and the government of Ghana, Nigeria, Kenya and Tanzania encouraged the use of Radio, Television, Learning

management systems and social media such as WhatsApp Messenger for teaching and learning (Bonsu, Bervell, Armah, Aheto & Arkorful, 2021).

Digital technology is used in education (Also known as digitalisation in education) as either stand-alone technology to assist traditional face-to-face teaching, or facilitate purely online learning and blended learning. Computers and projectors can be used to facilitate classroom teaching, while LMS such as Moodle can be employed to promote online or blended learning (Bervell & Umar, 2017).

Digitalisation programmes and Policies in Ghana's Educational System

A nation's economic growth and overall well-being are significantly influenced by education. Digital literacy and information and communications technology (ICT) has the power to revolutionise our educational institutions and economic systems. As a result, to bridge the digital gap, ICT policy and educational practices must change, and educators must be prepared to use ICT in their professional approach to address issues with establishing digital literacy (Amanfu, 2020).

Since 2007, Ghana has made great efforts to encourage the digitalisation of its educational system through the use of ICTs in educational policy. Increasing access to the usage of ICTs in the education sector has advanced significantly despite the previously disorganized governmental approach to policy formulation. The most sophisticated ICT deployment is in the postsecondary school level, followed by the pre-tertiary level, such as the basic education. Overall, there has been a lot of hope for enormous progress once the implementation of the strategy has started (Mangesi, 2007).

The government of Ghana has promoted the use of ICT in education over the past ten years to improve educational outcomes. For example, the 2003–2015 and 2010–2020 Education Strategic Plans recognised the importance of ICT in education to advance the goals of Access, Quality, Gender and Inclusiveness, and Education Management. Again, in order to achieve the national goal of "transforming Ghana into an information and knowledge-driven ICT literate nation," the government of Ghana created the ICT for Accelerated Development (ICT4AD) Policy in 2003, which explicitly outlined the plans and strategies in a framework of how ICTs can be used to facilitate that goal (Natia & Al-hassan, 2015). The ICT4AD policy emphasises the deployment and exploitation of ICTs in education ((Natia & Al-hassan, 2015).

Also, as part of The ICT in education policy for Ghana's digitalisation, there has been a promotion of ICT as a learning tool in the school curriculum at all levels (Mangesi, 2007; Boadu et al., 2019; Bonsu et al., 2020). Computers, Projectors, and network supply, has been extended to most secondary schools in the country. Consequently, ICT programmes and projects have been initiated. These include GeSCI project undertaken by the Ministry of Education, Youth and Sports to expand the deployment of ICTs in schools in Ghana. The Ministry of Education also initiated the Nepad E-Schools project in 2005 to support six schools in six regions with ICT infrastructure (Mangesi, 2007).

Challenges Facing Digitalisation programme of Government

Financial Constraint: Digitalisation of a country is a capital-intensive adventure. This colossal investment scares governments in developing countries

from implementing digitalisation programmes (Kuldosheva, 2021). Those governments in Africa who are able to implement digitalisation programmes halt half-way due to lack of funds. It should also be noted that financial constraint is attributed to the lack of government digital infrastructure in Africa (source).

Lack of Infrastructure: Although there has been an increasing availability of personal computers and mobile phones, digitalisation infrastructure in the developing world such as Africa, continues to fall behind the developed world. Africa's inability to meet the growing demand for digital services is due to accessibility and internet connectivity issues (Arakpogun, Elshahn, Nyuur & Olan, 2020). The internet bandwidth available to transport data between Africa and the rest of the globe is around one-seventh of Europe's international bandwidth capacity (Les Cottrell, 2013). This affect digitalisation of the continent.

Limited use of African Language in Digital Content: The digital content and the limited use of African native languages present additional impediments to the effective use of digitalisation. The majority of digital content is written in other languages, including English, French, Spanish, and Portuguese. However, few of them are in African dialects like Zulu, Swahili, and Yoruba (Nyirenda-Jere & Biru 2015). The implication is that the uneducated African would not be able to use such a government digitalisation programme or platform. Less than 10% of Africans even speak France and English, as Hussain and Mohan (2008) observed, yet these languages have been given special focus in usage. As a result, the absence of appropriate digital content and services tends to discourage individuals from being part of the digital world (Dutta, Geiger & Lanvin, 2015).

Inadequate Human Resources: the increased demand for digitalisation in Africa creates issues with human resources (Hassine, 2021). To create, operate, and administer platforms and tools for digitalisation, technicians, specialists, and engineers are required. According to Herzog & Bender (2017), the human element is crucial to the success of digital transitions.

Empirical Review

Teachers' Level of Awareness of Digitalisation programmes

Alasoluyi (2021) examined senior high school teachers' awareness and competence in the switch from classroom-based to online teaching during COVID-19 pandemic in Nigeria. The quantitative study which employed sample size of 378 participants revealed that teachers are reasonably aware of the switch from classroom-based to online teaching.

Similarly, Hendawi and Nosair (2020) assessed the extent of the technological awareness of students-teachers at the College of Education at Qatar University. By adopting a descriptive survey, the results of the study showed that the students-teachers have a higher level of technology awareness.

In the same vein, Ngozi, Ngozi and Joy (2010) examined the awareness of teachers of nursery and primary schools on the existence of the technological resources are used to support instruction. Through a simple-random sampling technique, a self-developed questionnaires were administered to Five (500) nursery and primary school teachers using simple random sampling technique. Questionnaire was the instrument used for data collection. The findings of the study

revealed that teachers were able to identify the technological tools that could be used to enhance instruction but are not aware of how such resources could be used.

Teachers' Attitude towards Digitalisation Programmes

Oladosu (2012) studied teachers' awareness and attitude towards digitalisation. The study utilised questionnaire as the research instrument. Using descriptive statistics, the findings showed that teachers' have the right attitude towards digitalisation.

Also, Rana and Ali (2016) scrutinised students' attitude towards the digitalisation of Bangladesh. The quantitative design revealed that student-teachers mostly have positive attitude digitalisation programme of the government.

Valle, Barroso and Alcalá (2022) examined perceptions and attitudes of Spanish "Digital Seniors" towards e-government through a telephone survey involving 405 Internet users between 60 and 79 years of age. The study revealed that the older citizens have negative attitude towards government -services.

Teachers' Use of Digitalisation programmes

Ngozi, Ngozi and Joy (2010) researched the awareness nursery and primary school teachers on the existence of the technological resources are used to support instruction. The outcome of the study revealed that teachers were not aware of how technological resources could be used to improve teaching.

Again, Ovcharuk et al. (2022) examined the use of digital learning tools by teachers of Ukrainian secondary schools for the organisation of distance learning. In order to collect data, they used the survey instruments. The 1463 respondents revealed they use digitalised tools to enhance instruction.

Bytyqi (2018) researched the digital tools that are available for students and teachers to use in an English as a foreign language (EFL) classroom and their perceptions of the inclusion of digital tools. The data retrieved demonstrates that educators mainly use digital tools when teaching.

In conclusion, concerning teachers' level of awareness, the literature revealed that teachers are aware of various technology used in teaching. Unfortunately, none of the literature reviewed concentrated solely on government digitalisation. Moreover, the literature also showed that teachers have positive attitude to digitalisation. Here with the exception of Also, Rana and Ali (2016) who looked at government digitalisation the rest focused on digitalisation in the classroom in general. Lastly, the reviewed literature also showed that teachers use digital tool. However, the literature was silent on whether the digital tools used by teachers are part of government digitalisation programmes. It is against this backdrop that this study seeks to examine teachers' awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis.

Chapter Summary

This chapter examined concepts such the differences between digitalisation and digitisation, digitalisation in education, digitalisation programmes and policies in Ghana's educational system and challenges facing digitalisation programmes in Africa. Additionally, the theoretical basis for the study focused on diffusion innovation theory. Diffusion of innovation theory help to understand the spread of information system innovations within and among communities. The theory was

necessary as the theoretical basis for the study since teachers who are role models to students could be likened to Rogers "innovators" are the first group to adopt an innovation and they understand and apply complex technical knowledge that is essential for spreading the innovation from outside classroom into the classroom.

Moreso, concerning the empirical review, literature on teachers' level of awareness showed that teachers are aware of various technology used in teaching. Moreover, the literature also revealed that teachers have positive attitude to digitalisation. Lastly, the reviewed literature also showed that teachers use digital tool.



CHAPTER THREE

RESEARCH METHODS

Introduction

The methodology used to conduct the study is presented in this chapter. It describes the research design, the target population, the sampling size, the sampling method, the research instruments, the validity and reliability of the research instruments, the data collection processes, and the data analysis and techniques and ethical considerations.

Research Design

The descriptive research survey design was adopted for the study. This design is a fact-finding study, which involves collecting data directly from a population thereof at a particular time (Kothari, 2004). The descriptive research strategy is appropriate for this study because it helps to seek explanations of certain aspects of social phenomena such as opinions, and attitudes of the respondents (Mohajan, 2018). The descriptive research design was relevant to this study because it has the advantage of producing a good number of responses from a wide range of the targeted population. Additionally, it provides a meaningful picture of events as it unfolds. The descriptive research design was appropriate for this study because it elicits a sizable number of responses from a broad spectrum of the study's target population. It also paints a significant picture of the course of events. However, descriptive survey design yields incorrect results since it probes into personal issues that people might not be entirely honest about. Despite these flaws, the descriptive survey was appropriate because of its thorough coverage of several individuals or

events. This means it is more likely to obtain data based on a representative sample to be generalized to a population (Kelly, Clark, Brown & Sitzia, 2003).

Study Area

One of Ghana's 261 Metropolitan, Municipal, and District Assemblies (MMDAs), the Kumasi Metropolitan Assembly (KMA) is one of the 43 MMDAs in the Ashanti Region, which has Kumasi as its administrative centre. The Kumasi Metropolitan is situated between Latitude 6.35° N and 6.40° S and Longitude 1.30° W and 1.35° E, and is elevated 250 to 300 meters above sea level. It is roughly 270 kilometres north of Accra, the nation's capital. It has a surface area of approximately 214.3 square kilometres which is about 0.9 percent of the region's land area. With a 5.47 percent annual growth rate, the city is expanding quickly. About 90 suburbs are included within its borders, many of which were included in it due to its growth and physical expansion. According to the 2021 Population and Housing Census 443,981 people are living in the Metropolis, including 213,662 men and 230,319 women.

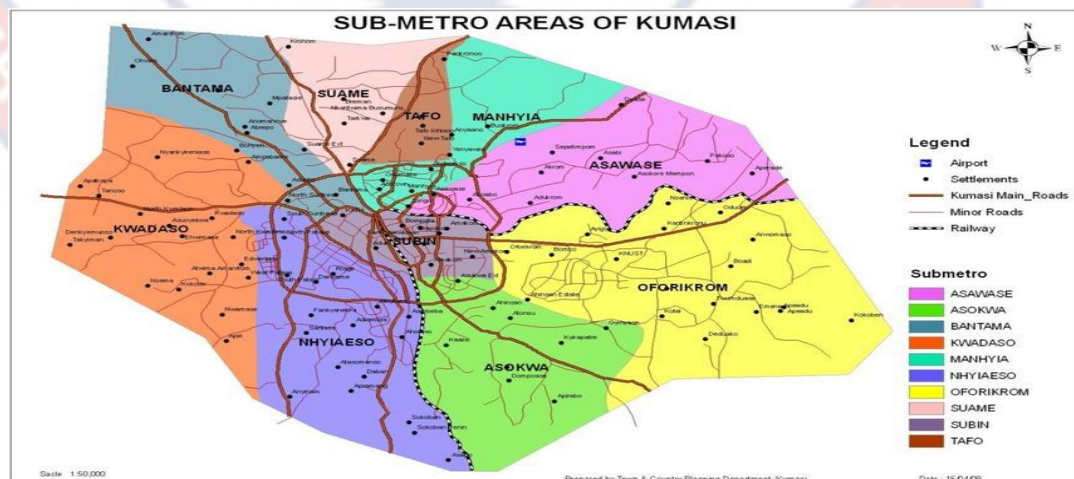


Figure 1: Map of Kumasi Metropolis

Population of the Study

The population for the study comprised teachers from all 15 senior high schools in the Kumasi Metropolis. They comprised 2151 teachers. However, the accessible population consisted of 800 teachers from 5 selected schools: Asanteman Senior High School, Prempeh College, Adventist Senior High, Kumasi Wesley Girls Senior High School and Osei Kyeretwie Senior High School. Table 1 presents a summary of the accessible population of each selected school.

Table 1: Summary of Accessible Population

School	Population
Adventist Senior High School	143
Asanteman Senior High School	147
Kumasi Wesley Girls High School	145
Osei Kyeretwi Senior High	176
Prempeh College	189
Total	800

Source: Field Data, Ocran (2023)

Sample and Sampling Procedures

Sampling refers to the process of selecting a portion of the population to represent the entire population. Generally, sampling enables the researcher to study a relatively small number of units in place of the target population and obtain data representative of the whole target population (Amedehe & Asamoah-Gyimah, 2019). A sample, on the other hand, consists of a carefully selected subset of the units that comprise the population. In most cases, researchers opt for incomplete coverage and study only a small portion of the population called Sample (Amedehe

& Asamoah-Gyimah, 2019). Out of 800 accessible population, 260 were involved in this study. The decision to settle on this figure was informed by the table of determining sample size proposed by Krejcie and Morgan (1970). According to this table, it is appropriate to use 260 if the study population is 800. The proportionate and simple random sampling techniques were then used to select teachers in the selected schools to respond to the questionnaire. The sample size from each school is presented in Table 2 below:

Table 2: Sample Size Distribution for the Selected Schools

School	Population	Sample Size
Adventist Senior High School	143	46
Asanteman Senior High School	147	48
Kumasi Wesley Girls High School	145	47
Osei Kyeretwi Senior High	176	58
Prempeh College	189	61
Total	800	260

Source: Field Data, Ocran (2023)

Data Collection Instruments

The data collection instrument used for the study was self-developed questionnaire. The questionnaire had four sections. Section ‘A’ consists of demographic data of respondents; section ‘B’ assessed teachers’ awareness of government digitalisation programmes in the Kumasi Metropolis; Section ‘C’ examined teachers’ attitudes towards government digitalisation programmes and the impacts of these programmes on education in the Kumasi Metropolis; and section ‘D’ also assessed the level of use of digitalisation programmes of teachers

in the Kumasi Metropolis. In all, the questionnaire was made up of 35 items, with Section 'A' consisting of four (3) items and sections B, C, D contained (32) items in total.

Also, all items on the questionnaire were measured on four (4) and five (5) points Likert scale responses from very-much aware (VA) to not aware (NA), and from strongly agree (SA) to Strongly Disagree (SD), respectively. On advantage of using a questionnaire is that it is less expensive and can easily be used to reach out to a wider range of respondents hence the reason for choosing it as the instrument for collecting data.

Validity and Reliability of the Instrument

A pilot test was carried out at Osei Tutu Senior High before the actual data collection started. The choice of school was because it has a similar learning environment and learning conditions as the main respondents. The prime purpose of the pilot testing was to ascertain the reliable nature of the questionnaire used for the study. The researcher visited the school a week earlier to seek for authorisation from the management of the school and the teachers. The questionnaire was then administered to 50 teachers of the school through their respective heads of departments.

The data gathered was coded into the variable view of the Statistical Package for Social Sciences (SPSS 24.0) to create a template. Furthermore, the responses from the respondents were then keyed one after the other in the data view of the SPSS before Cronbach Alpha reliability analysis was conducted in Statistical Package for Social Sciences to determine whether the questionnaire used for the

pilot test was reliable. After the analysis was conducted in Statistical Package for Social Sciences, an overall reliability coefficient of 0.87 was obtained, indicating that the questionnaire was reliable based on the acceptable Cronbach alpha range of 0.70-0.94 (Taber, 2018). Table 3 shows the detailed of the reliability coefficient for each variable:

Table 3: Cronbach Alpha reliability

Variable	Cronbach Alpha reliability coefficient
Level of Awareness	.899
Attitude	.818
Level of Use	.715

Source: Field Data, Ocran (2023)

Data Collection procedure

An introductory letter was obtained from the College of Distance Education, University of Cape Coast (UCC). The letter was sent to the Kumasi Metro office of the Ghana Education Service to seek approval to conduct the study in the Metropolis. Five additional letters were also sent to the management of the five (5) schools to seek permission to administer the questionnaires in their schools. After all the five schools granted approval for the study to be carried out at their institution, the researcher visited each school to administer the questionnaires directly to the teachers.

As a matter of importance, the participants were assured of their anonymity and it was made clear to them that the information they provided was to be treated as confidential information. The respondents were given enough time to complete

the questionnaire. In all, 260 questionnaires were administered, filled correctly and returned. This represented a 100 per cent return rate.

Data Processing and Analysis

In order to address the research questions and hypotheses formulated, the data obtained from the respondents was filtered to remove any irrelevant responses and then coded. The questionnaire was serially numbered and coded for easy identification and analysis. With respect to the coding, the items on the five-point Likert scale were assigned numerical values of 1, 2, 3, 4 and 5 for each Likert scale indicating “strongly disagree (1), disagree (2), agree (3), Neutral (4) and strongly agree (5)” while items on the four-point Likert scale were assigned numerical values 1, 2, 3 and 4 for each scale indicating “Not Aware (1), Somehow Aware (2), Aware (3), and Very-much Aware (4).”

The researcher employed descriptive statistics such percentages and frequencies for the background data of the respondents. The hypotheses one and two, on the other hand, were analysed with linear regression. Also, mean and standard deviation were employed to analyse research questions 1, 2 and 3. The conclusions that were made were based on the following decision rules for mean values and standard deviation values:

Decision Rule for Mean Values for the Four Points Likert scale

- *1 to 1.4 = Not Aware (NA)*
- *1.5 to 2.4= Somehow Aware (SA)*
- *2.5 to 3.4= Aware(A)*
- *3.5 to 4.0= Very Aware (VA)*

Decision Rule for Mean Values for the Five Points Likert scale

- $1-1.4 = \text{Strongly Disagree}$
- $1.5-2.4 = \text{Disagree}$
- $2.5-3.4 = \text{Neutral}$
- $3.5-4.4 = \text{Agree}$
- $4.5-5.0 = \text{Strongly Agree}$

Decision Rule for Standard Deviation Values

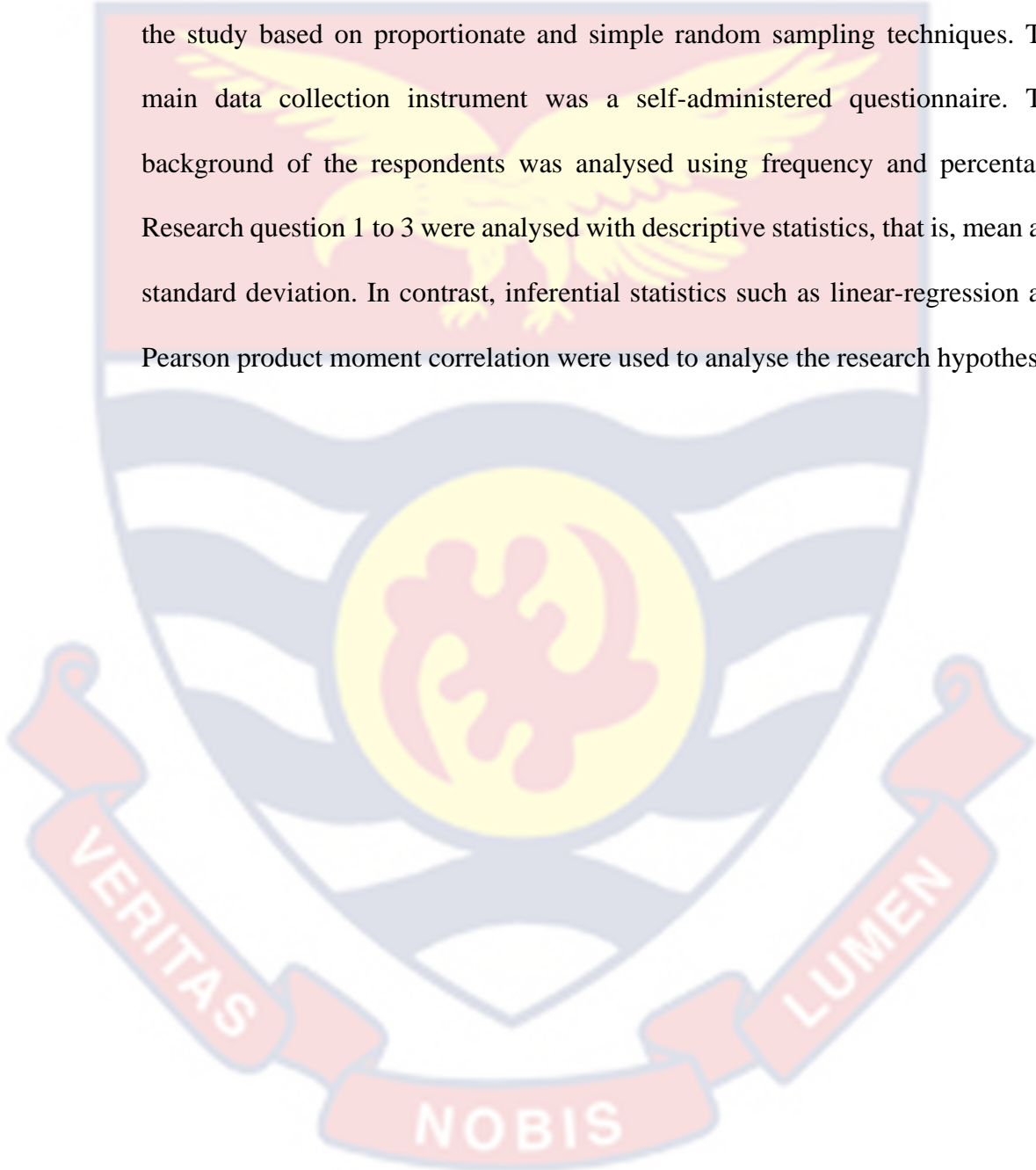
- *Standard Deviation of 1.0 and below = Responses from the respondents are homogeneous.*
- *Standard Deviation greater than 1.0 = Responses from the respondents are heterogeneous.*

Ethical Consideration

The researcher took steps to ensure adherence to proper ethical norms and procedures for conducting a research study. In order to obtain permission for the study, a letter of introduction was first obtained from the College of Distance Education at the University of Cape Coast. The letter was then sent to the Ghana Education Service, Kumasi Metro and the five schools for permission to carry out the study. Additionally, a provision guaranteeing respondents' anonymity and confidentiality was added to the questionnaire's introduction. Finally, without favouritism or personal bias, the researcher objectively analysed and reported the results.

Chapter Summary

As a quantitative study, the descriptive survey research design was used. The sample size for the study was 260 teachers. These teachers were selected for the study based on proportionate and simple random sampling techniques. The main data collection instrument was a self-administered questionnaire. The background of the respondents was analysed using frequency and percentage. Research question 1 to 3 were analysed with descriptive statistics, that is, mean and standard deviation. In contrast, inferential statistics such as linear-regression and Pearson product moment correlation were used to analyse the research hypotheses.



CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of this study was to investigate teachers' awareness of, attitude towards and use of government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis. The researcher used questionnaires to gather data from respondents for the study. The data gathered were analysed through the computation of descriptive and inferential statistics. This chapter presented the interpretations, discussion and inferences that were made from the analysis.

Analysis of Data from Respondents

The Table 4 show the results of the respondents regarding their gender, age group and work experience.

Table 4: Demographic Information of Respondents (n=260)

Category	Sub-Category	Frequency	Percentage
Gender	Male	195	75
	Female	65	25
Age	Below 25 years	-	-
	26-35 years	123.5	47.5
	36-45 years	71.5	27.5
	46-55 years	52	20.0
	Above 55 years	13	5.0
Teaching Experience	1-5 years	26	10

Table Continued

6-10 years	26	10
11-15 years	97.5	37.5
16-20 years	39	15
21-25 years	45.5	17.5
26-30 years	-	-
31-35 years	19.5	7.5
Above 36 years	6.5	2.5

Source: Field Data, Ocran (2023)

It is evident from Table 4 that 260 respondents participated in the study to assess teachers' awareness of, attitude and use of government of Ghana's digitalisation programmes. Out of the total respondents who were involved in the study, 75% were males, while 25% were females. It should be noted that the gender inequality recorded is an indication that male teachers dominate the senior high schools in the Kumasi Metropolis. Again, concerning the age groups of the respondents, 47.5% were between the ages of 26 to 35 years, 27.5% were between 36 to 45 years, 20% were between 46 to 55 years, and 5% were 56 years old and above. Thus, the majority of the respondents were between the ages of 26 to 35 years.

Furthermore, concerning the teaching work experience of the respondents, 10% have 1 to 5 years of work experience and 6 to 10 years of work experience in teaching. 37.5% also have 11 to 15 years of work experience, 15% have 16 to 20 years of work experience, and 17.5% have 21 to 25 years of work experience. Also,

7.5% of the respondents have 31 to 35 years of work experience and 2.5% have work experience above 36 years. The majority of the respondents had 11 to 15 years of work experience, pointing to the fact that they are knowledgeable and experienced teachers.

Research Question One (1): What is the level of awareness of teachers about government digitalisation programmes in the Kumasi Metropolis? Research question one sought to examine the level of awareness of teachers about government digitalisation programmes in the Kumasi Metropolis? The results are presented in Table 4

Table 5: Level of Awareness of Teachers About Government Digitalisation Programmes in the Kumasi Metropolis

Statements on Level of Awareness	M	SD
e-Travel Card for government officials	2.5	1.20
Biometric National ID cards	3.57	.63
National digital property addressing system	3.52	.82
Institutionalised paperless port operations	3.17	.96
Online passport application	3.45	.88
Mobile money interoperability	3.2	.94
Universal QR CODE payment system for banks and mobile wallets.	3.1	.93
Wi-Fi to Senior High Schools	3.7	.69
Digitisation of hospitals and medical records.	3.4	.96

Table Continued

Motor Insurance Database	2.98	1.0
Computerised school selection placement system (CSSPS)	3.7	.82
Online downloading of lesson notes.	3.2	1.0
One teacher, one laptop programme.	3.7	.83
Digitisation of The Driver and Vehicle Licensing Authority (DVLA)	3.3	1.0
Digitised renewal of health insurance	3.7	.86

Source: Field Data, Ocran (2023)

Mean of means = 3.34

From table 5, the result revealed that the majority of teachers were aware of the e-Travel Card for government officials (M=2.45, SD=1.2), institutionalised paperless port operations (M=3.17, SD=.96), mobile money interoperability (M=3.2, SD=.94), Universal QR CODE payment system for banks and mobile wallets (M=3.1, SD=.93), digitisation of hospitals and medical records (M=3.4, SD=.96), online downloading of lesson notes (M=3.2, SD=1.0), digitisation of the driver and vehicle licensing authority (DVLA)(M=3.3,SD=1.0) and motor insurance database(M=2.98, SD=1.0).

In addition, the respondents were very much aware of the existence of biometric national ID cards (M=3.57, SD=.63), national digital property addressing system (M3.52, SD=.82), Wi-Fi to Senior High Schools (M=3.7, SD=.69), computerised school selection placement system (CSSPS) (M=3.7, SD=.82), “one

teacher, one laptop programme” (M=3.7, SD=.83), and the digitised renewal of health insurance (M=3.7, SD=.86). All in all, the mean of means value of 3.34 indicates that the respondents, teachers, were aware of the existence of government digitalisation programmes. Thus, the awareness of level of teachers regarding government digitalisation programmes was very high.

Research Question Two (2): What is the attitude of teachers towards the use of digitalisation programmes in the Kumasi Metropolis? Research question two sought to assess teachers’ attitude towards the use of digitalisation programmes in the Kumasi Metropolis? The results are presented in Table 6.

Table 6: Attitude of Teachers Towards the Use of Digitalisation Programmes in the Kumasi Metropolis

Statements on Attitude	M	SD
As a teacher, I am happy about government’s digitisation programmes.	4.5	.56
I am sure education will stand to benefit from the government’s digitisation programmes.	4.3	.67
The digitalisation agenda is helping the economy of Ghana.	4.1	.10
I find the use of digital programmes more flexible than the traditional one.	3.96	.92
The digitisation agenda has come to make my work easier as a teacher.	3.7	1.10

Table Continued

I would love to use the various digitised programmes being introduced.	3.95	.93
As a teacher, I find the digitisation programme very useful.	4.3	.76
I do not think the government's digitisation agenda has anything better to help the country.	1.83	1.38
I believe that the digitisation programmes will help the education sector to improve.	4.3	.78

Source: Field Data, Ocran (2023)

Mean of means = 3.88

Table 6 results indicated that the respondents strongly agreed with the statement that sought to find out whether as a teacher they are happy about government digitalisation programmes (M=4.5, SD=.56). Furthermore, when asked whether the respondents are sure the education sector will stand to benefit from the government's digitisation programmes, they agreed (M=4.3, SD=.67).

The digitalisation effort of the government of Ghana is aimed at improving the current economy. As such, the respondents agreed with the statement that the digitalisation agenda is helping the economy of Ghana (M=4.1, SD=.10) and that they find the use of digital programmes more flexible than the traditional one (M=3.96, SD=.92).

The respondents also strongly believe that the digitalisation agenda has come to make their work easier as a teacher. This is evident by the mean (M) of 3.7

and the standard deviation (SD) of 1.10. In addition, inasmuch as the respondents believe that the digitalisation agenda makes their work easier, they also agreed that they would love to use the various digitised programmes being introduced (M=3.95, SD=.93).

Moreover, the respondents agreed with the statement that asked whether, as a teacher, they find the digitisation programme very useful (M=4.3, SD=.76) and that the digitisation programmes will help the education sector to improve (M=4.3, SD=.78). However, when the respondents were asked whether they do not think that government's digitisation agenda has anything better to help the country, the majority of the respondents disagreed (M=1.83, SD=1.38), indicating that the government digitalisation agenda has something better to offer to the country and the teachers.

In conclusion, the mean of means value of 3.88 showed that overall, the respondents had positive attitude towards the digitalisation agenda of the government.

Research Question Three (3): What is the level of use of digitalisation programmes of teachers in the Kumasi Metropolis? Research question three sought to assess teachers' level of use of digitalisation programmes in the Kumasi Metropolis. The results are presented in Table 7.

Table 7: Teachers' Level of Use of Digitalisation Programmes in the Kumasi Metropolis

Statements on Level of Use	M	SD
I am able to transfer money across different networks.	4.35	.80
I do use any of the government's digitisation programme.	4.4	.50
I use the online passport	4.4	.84
Digital platforms such as CSSPS has made placement of students into the second cycle level stress free, more efficient and effective.	4.4	.68
Using the QR code payments system for banks has enabled the teacher maximise his/her instructional time and also in e-commerce.	4.0	.89
In general, I have been using the government's digitised services	4.7	.53

Source: Field Data, Ocran (2023)

Mean of means = 4.37

Table 7 presents data on teachers' level of use of government digitalisation programmes in the Kumasi Metro. The outcome of the analysis showed that teachers, who were the respondents of the study, were able to transfer money across different networks ($M=4.35$, $SD=.80$). Additionally, the respondents agreed that they do use any of the government's digitisation programme ($M=4.4$, $SD=.50$) and online passport ($M=4.4$, $SD=.84$).

Moreover, when asked whether the respondents use digital platforms such as CSSPS has made placement of students into the second cycle level stress free, more efficient and effective, they agreed with the statement ($M=4.4$, $SD=.68$). Although the respondents agreed with the statement, this is particularly surprising since one expects the teachers to strongly agree with the statement. This could be because some SHS teachers know nothing about the CSSPS since they do not teach at the Junior High School Level.

Also, the respondents agreed with the statement that using the QR code payments system for banks has enabled them maximise their instructional time and also in e-commerce ($M=4.0$, $SD=.89$). In general, the overwhelming majority of the respondents have been using the government's digitised services ($M=4.7$, $SD=.53$). In conclusion, the mean of means of 4.37 indicates that Senior High School teachers at the Kumasi Metro use digitalisation programmes and services.

Analysis of Research Hypotheses

The researcher employed linear regression analysis to explore and answer research hypotheses 1 and 2. The researcher started by performing a preliminary analysis to verify the linearity, homoscedasticity, independence, and normality, which are the four assumptions of regression. According to the preliminary investigation, linear regression's assumptions were all satisfied.

Research Hypothesis One (1): There is no statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis. This research hypothesis was

analysed using linear regression analysis. The results of the analysis are presented in Table 8.

Table 8: Predictive Relationship Between Teachers' Level of Awareness and Teachers' Attitude towards Digitalisation Programmes in Kumasi Metropolis.

Coefficients Table								
Variable	B	β	t	p	R ²	VIF	95% Confidence Interval	
							Lower Bound	Upper Bound
(Constant)	23.756		5.930	.000			15.647	31.866
Level of Awareness	.227	.079	2.883	.006	.180	1.0	.067	.386

Source: Field Data, Ocran (2023)

Significant at .01 Alpha Level

From the coefficients' table, teachers' level of awareness of government digitalisation programmes predicted their attitude towards digitalisation programmes with $\beta=.079$ and $t=2.883$ at $p=0.006$, $p \leq 0.01$ threshold. The prediction is further validated by the confidence interval of 95% at lower and upper boundaries of .067 and .386, respectively. The unidimensionality of the confidence interval values indicate that the prediction was valid in significance.

Furthermore, the predictor variable, teachers' level of awareness, in the model determined a total variance of 18% explanation in the dependent variable (teachers' attitude towards digitalisation programmes). This means that about 82% of variance was unexplained by the predictive model for teachers' attitude towards digitalisation programmes. The implication is that additional variables are needed

to fully explain the total variance in teachers' attitude towards digitalisation programmes prediction.

Lastly, the variance inflation factor (VIF) value of 1.0 also showed an absence of collinearity effects based on the 3.3 recommendation by Kock (2015) and Hair et al., (2017). From the foregoing, the study rejected the null hypothesis which stated that there is no statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis for the alternative hypothesis.

Research Hypothesis Two (2): There is no statistically significant relationship between teachers' attitude towards digitisation and teachers' level of use of digitalisation programmes in Kumasi Metropolis. This research hypothesis was analysed using linear regression analysis. The results of the analysis are presented in Tables 9.

Table 9: Predictive Relationship Between Teachers' Attitude towards Digitisation and Teachers' Level of Use of Digitalisation Programmes in Kumasi Metropolis.

Coefficients Table								
Variable	B	β	t	p	R ²	VIF	95% Confidence Interval	
							Lower Bound	Upper Bound
(Constant)	17.169		7.226	.000			12.385	21.952
Attitude	.259	.534	3.895	.000	.285	1.0	.125	.394

Source: Field Data, Ocran (2023) Significant at .01 Alpha Level

The regression result from Table 9 indicates that teachers' attitude towards government digitalisation programmes predicted their level of usage of

digitalisation programmes with $\beta=.534$ and $t=3.895$ at $p=0.000$, $p\leq 0.01$ threshold. The significance of the prediction is further validated by the confidence of 95% with unidirectional lower boundary value of .125 and upper boundary value of .125.

The coefficient of determination (R^2) of .285 also indicates that teachers' attitude towards digitalisation determined about 28.5% of variance in explaining teachers' level of use of digitalisation programmes. The acceptable variance inflation factor (VIF) threshold of 1.0 also showed an absence of collinearity effects in the measurement (Kock, 2015; Hair et al., 2017). Hence, the study rejected the null hypothesis which stated that there is no statistically significant relationship between teachers' attitude towards government digitisation and teachers' level of use of digitalisation programmes in Kumasi Metropolis for the alternative hypothesis.

Correlation Analysis

Research hypotheses 1 and 2 were analysed using Pearson product moment correlation coefficient. Pearson product moment correlation coefficient determines the strength and direction of a linear relationship between two or more variables. The range of values for the Pearson correlation coefficient (r) ranges from -1 to +1.

The assumptions of the Pearson product moment correlation such as level of measurement, related pairs, absence of outliers, and linearity were all tested before the main analysis was conducted. The preliminary analysis revealed that all the assumptions were met. The correlation's significance was assessed using the significant values of 0.01 and 0.05. In Table 10, study results are displayed.

Table 10: Association Between Teachers' Level of Awareness and Teachers' Attitude Towards Digitalisation Programmes in Kumasi Metropolis.

Pearson Product Moment Correlation	
Pearson Correlation	.424**
Sig. (2-tailed)	.006
N	260

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The result indicated there is a mild, positive association between level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis ($r=.424$ $p<0.006$). This implies that when teachers' aware of government digitalisation programmes, their attitude towards it also increases/becomes positive, and vice versa.

Table 11: Association Between Teachers' Attitude Towards Digitisation and Teachers' Level of Use of Digitalisation Programmes in Kumasi Metropolis.

Pearson Product Moment Correlation	
Pearson Correlation	.534**
Sig. (2-tailed)	.000
N	260

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The finding showed a strong, positive association between teachers' attitude and their level of use of government digitalisation programmes in Kumasi Metropolis, ($r=.534$ $p<0.000$). Thus, it can be concluded that teachers utilise government digitalisation programmes when they possess positive attitude towards

it. Also, teachers will not utilise government digitalisation when they possess negative attitude.

Discussion of Results

Concerning Research Question, which examined the level of awareness of teachers about government digitalisation programmes in the Kumasi Metropolis, the mean of means value of 3.34 indicates teachers were aware of the existence of government digitalisation programmes in Kumasi Metro. Specifically, the teachers were aware of digitalisation programmes such as biometric national ID cards, national digital property addressing system, institutionalised paperless port operations, online passport application, mobile money interoperability, universal QR CODE payment system for banks and mobile wallets, Wi-Fi to Senior High Schools, and Computerised school selection placement system (CSSPS). Thus, the awareness of level of teachers regarding government digitalisation programmes was very high. The findings of the study are similar to the result of Ngozi, Ngozi and Joy (2010) and Hendawi and Nosair (2020) who revealed that teachers and students-teachers have a higher level of technology awareness.

Furthermore, regarding research question two which assessed the attitude of teachers towards the use of digitalisation programmes in the Kumasi Metropolis, the mean of means value of 3.88 showed teachers in the Kumasi Metro had positive attitude towards the government digitalisation agenda. This implies that the attitude of teachers about government digitalisation effort was favourable. This above finding corroborates with the result of Oladosu (2012) who reported that teachers' have the right attitude towards digitalisation. Rana and Ali (2016) also found that

in Bangladesh, a developing country like Ghana, student-teachers mostly have positive attitude digitalisation programme of the government.

Also, research question three, which explored the level of use of digitalisation programmes of teachers in the Kumasi Metropolis, had a mean of means of 4.37, indicating that teachers at the Kumasi Metro use digitalisation programmes and services. This outcome is in line with similar studies by Bytyqi (2018) and Ovcharuk et al. (2022) who found that teachers use digitalised tools to enhance instruction. However, the finding opposes that of Ngozi, Ngozi and Joy (2010) who revealed that Nigerian teachers were not aware of how technological resources could be used to improve teaching.

In addition, the research hypothesis one which examined the relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis found that, teachers' level of awareness of government digitalisation programmes predicted their attitude towards digitalisation programmes. This means that if teachers are aware of a digitalisation programme or tool, their attitude towards it will be positive and vice versa.

Lastly, research hypothesis two which sought to find the relationship between teachers' attitude towards digitisation and teachers' level of use of digitalisation programmes in Kumasi Metropolis revealed that, teachers' attitude towards government digitalisation programmes predicted their level of usage of digitalisation programmes. Thus, whenever users of a digitalisation tool have positive attitude, they would be likely to use the tool. Teachers with negative

attitude towards government digitalisation programmes are those who are less likely to use digitalisation programmes.

Chapter Summary

In conclusion, the result from research question one showed that the respondents were aware of government digitalisation efforts. Also, the outcome of research question two revealed that teachers had positive attitude towards the digitalisation agenda of the government. Additionally, the finding from research question three revealed that teachers in senior high schools in the Kumasi Metro have been using the government's digitised services. Concerning hypothesis one, the finding from the linear regression and Pearson product moment correlation analysis unravelled that teachers' level of awareness of government digitalisation programmes predicted their attitude towards digitalisation programmes. Lastly, the result of hypothesis two also showed that teachers' attitude towards government digitalisation programmes predicted their level of usage.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter summarises the outcome of the study. It provides a summarised discussion on the major findings of teachers' awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis. This chapter also draws conclusions and makes recommendations for practice and further research.

Summary

The prime purpose of the study was to examine teachers' awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis. The specific objectives of the study were to: assess teachers' awareness of government digitalisation programmes in the Kumasi Metropolis; examine teachers' attitudes towards government digitalisation programmes and the impacts of these programmes on education in the Kumasi Metropolis; assess the level of use of digitalisation programmes of teachers in the Kumasi Metropolis; find out how teachers' level of awareness affects teachers' attitude towards digitalisation programmes in Kumasi Metropolis; and ascertain how teachers' attitude towards digitisation affects teachers' level of use of digitalisation programmes in Kumasi Metropolis.

Consequently, to achieve the study's objectives, the following research questions and hypotheses were formulated:

Research Questions:

1. What is the level of awareness of teachers about government digitalisation programmes in the Kumasi Metropolis?
2. What is the attitude of teachers towards the use of digitalisation programmes in the Kumasi Metropolis?
3. What is the level of use of digitalisation programmes of teachers in the Kumasi Metropolis?

Research Hypotheses:

1. H_0 . There is no statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis.
2. H_0 . There is no statistically significant relationship between teachers' attitude towards digitisation and teachers' level of use of digitalisation programmes in Kumasi Metropolis.

In connection with these research questions and hypotheses, the study adopted the descriptive survey design. The population for the study constituted senior high school students in Kumasi Metro. Out of the population of 800 students, 260 sample size was used for the study. The sample size was used in accordance with Krejcie & Morgan's (1970) sampling table. Additionally, the simple random sampling technique was also used to select all the participants for the study.

Key Findings

The main findings of the study were as follows:

Research question one, which sought to examine teachers' level of awareness about government digitalisation programmes in the Kumasi Metropolis, found that teachers at senior high schools in the Kumasi Metro were aware of government digitalisation programmes.

Regarding research question two, which examined teachers' attitudes towards government digitalisation programmes in the Kumasi Metropolis, it was found that teachers have positive attitude towards government digitalisation programmes.

With regards to research question three, which assessed the level of use of digitalisation programmes of teachers in the Kumasi Metropolis, the study revealed that teachers use various government digitalisation programmes.

On the research hypothesis one, which stated that there is no statistically significant relationship between teachers' level of awareness and teachers' attitude towards digitalisation programmes in Kumasi Metropolis, it was revealed that teachers' level of awareness predicted teachers' attitude towards digitalisation programmes.

Concerning the research hypothesis two, which stated that there is no statistically significant relationship between teachers' attitude towards digitisation and teachers' level of use of digitalisation programmes in Kumasi Metropolis, the study showed that teachers' attitude towards digitisation predicted their level of use of digitalisation programmes.

Conclusions

The following conclusions could be deduced from the findings of this study:

Firstly, on the findings that senior high school teachers at the Kumasi Metro were aware of government digitalisation programmes, the study concluded that teachers are already aware of the various digitalisation programmes of the government. However, although teachers are aware of such digitalisation tools and services such as biometric national id cards, national digital property addressing system, institutionalised paperless port operations, online passport application, mobile money interoperability, universal QR CODE payment system for banks and mobile wallets, Wi-Fi to Senior High Schools and among others, these tools are not relevant to education except computerised school selection placement system (CSSPS). Thus, the government need to include educationally relevant digitalisation programmes to the national digitalisation programme. That notwithstanding, their awareness of government digitalisation programmes is the first step to its adoption or use.

Additionally, concerning the findings that teachers have positive attitude towards government digitalisation programmes, the study concluded that their positive attitude towards government digitalisation programmes directly indicates their acceptance of the effort of the government to digitalise all spheres of the economy.

Furthermore, on the findings that teachers use government digitalisation programmes, the study concluded that the government digitalisation effort has positive impact since its usage implies acceptance by teachers. Although teachers use various government digitalisation programmes in their everyday life, such use must include digitalised tools used for classroom instruction, such as blended

learning and e-resources. Thus, the government needs to implement digitalised technologies whose use could be applicable to classroom instruction.

Moreover, on the findings that revealed that teachers' level of awareness predicts teachers' attitude towards digitalisation programmes, it is concluded teachers are more likely to have positive attitudes if their awareness level of digitalisation programmes is high.

Lastly, regarding the findings that showed teachers' attitude towards government digitisation predicts their level of use of such programmes, the study concluded that attitude is a key mediating variable that determines the use of government digitalisation programmes. Hence, effort ought to be made to increase the attitude of potential users of government digitalisation programmes.

Recommendations

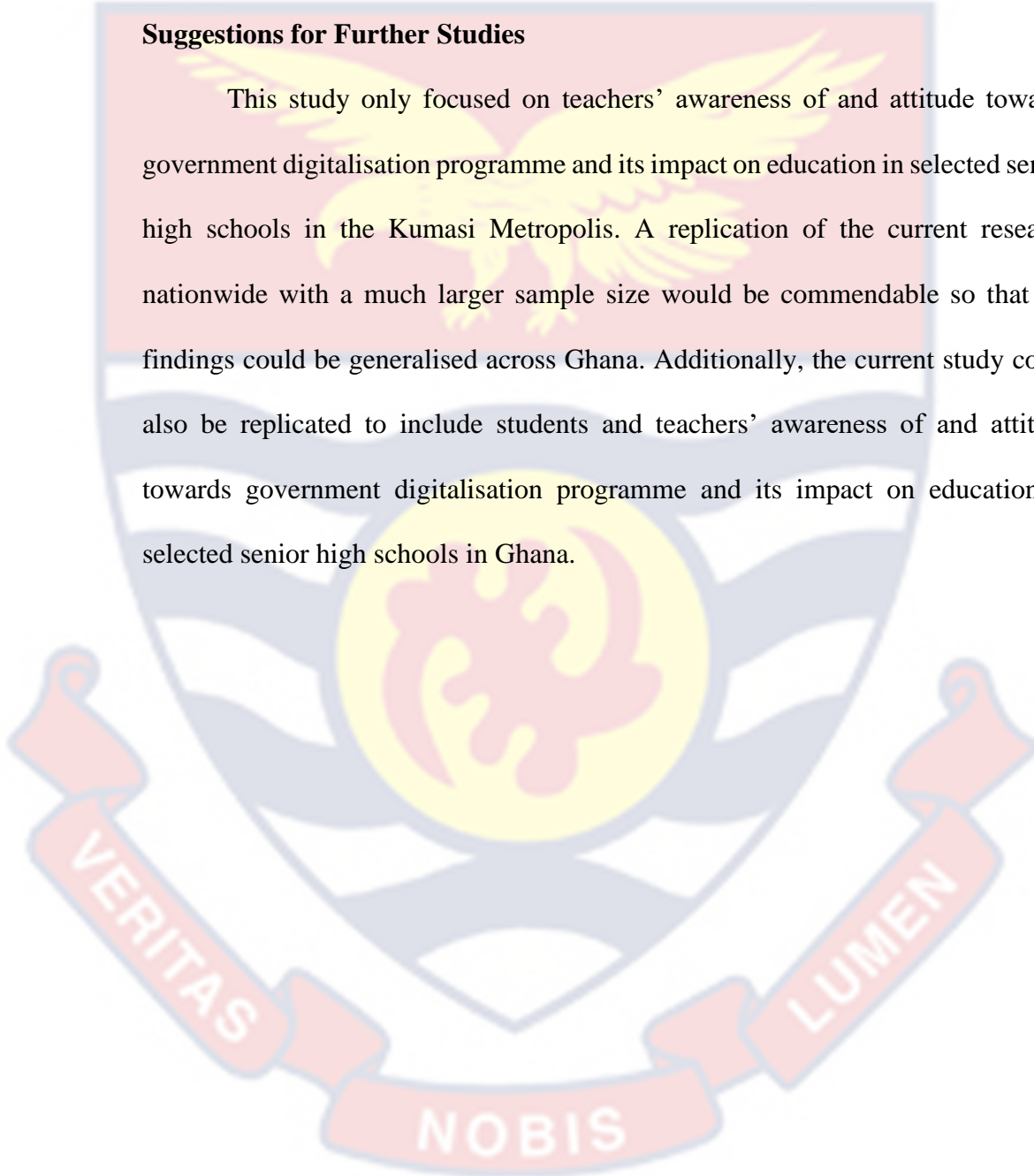
The study makes recommendations based on the conclusions drawn from the respective findings:

1. The study recommended that the government of Ghana should train teachers on the use of the various government digitalisation tools and platforms to enable teachers develop the necessary ICT skills and competencies.
2. The study recommended that the government of Ghana should extend its digitalisation agenda to the education sector.
3. It is recommended that teachers should adopt digitalised technology in the classroom to aid effective teaching and learning at the senior high school level in Ghana.

4. The study also recommended that the management of Ghana education service should take into cognizance the awareness level and attitude of teachers when implementing digitalised technology for education.

Suggestions for Further Studies

This study only focused on teachers' awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis. A replication of the current research nationwide with a much larger sample size would be commendable so that the findings could be generalised across Ghana. Additionally, the current study could also be replicated to include students and teachers' awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in Ghana.



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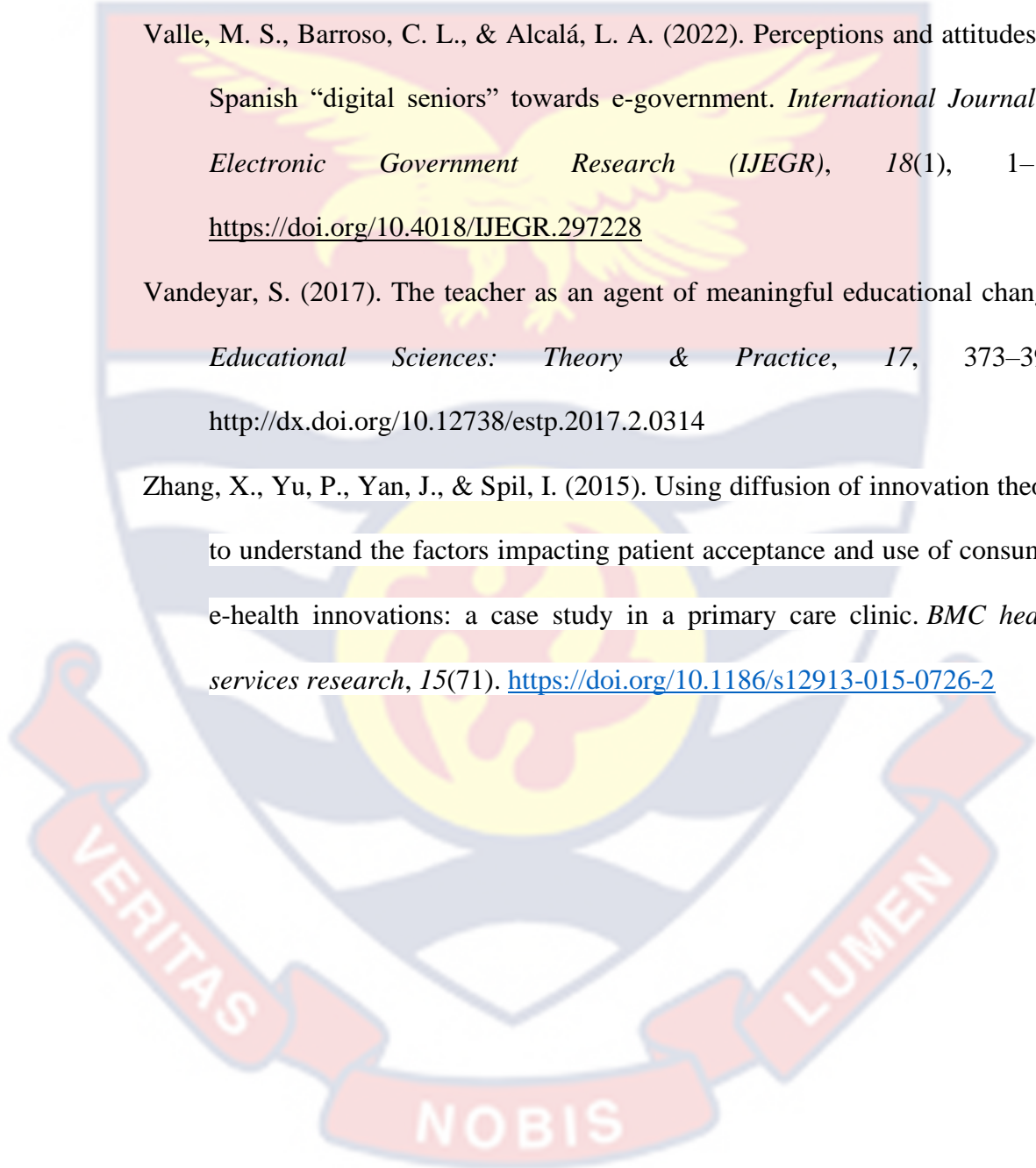
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APPENDIX A**UNIVERSITY OF CAPE COAST****QUESTIONNAIRE**

Dear Respondent, the purpose of the study is to investigate “Teachers’ awareness of and attitude towards government digitalisation programme and its impact on education in selected senior high schools in the Kumasi Metropolis.” I will therefore solicit your cooperation and consent to participate in this study. The confidentiality of your response is assured. Thank you.

SECTION A: Demographic Information

1. **Sex:** Male Female
2. **Age:** Below 25years 26-35 years 36 – 45years
46-55years Above 55 years
3. **Teaching experience:** 1-5 years
6-10 years
11-15 years
16-20 years
21-25 years
26-30 years
31-35 years
Above 36 years

**SECTION B: Teachers' Level of Awareness of Government Digitalisation
Programmes**

Please indicate whether you are Very-much Aware (VA), Aware (A), Somehow Aware (SA) Not Aware (NA) to the following:

Teachers Level of Awareness of Government's Digitalised Programmes	NA	SA	A	VA
4. e-Travel Card for government officials				
5. Biometric National ID cards				
6. National digital property addressing system				
7. Institutionalised paperless port operations				
8. Online passport application				
9. Mobile money interoperability				
10. Universal QR CODE payment system for banks and mobile wallets.				
11. Wi-Fi to Senior High Schools				
12. Digitisation of hospitals and medical records.				
13. Motor Insurance Database				
14. Computerised school selection placement system (CSSPS)				
15. Online downloading of lesson notes.				

16. One teacher, one laptop programme.				
17. Digitisation of The Driver and Vehicle Licensing Authority (DVLA)				
18. Digitised renewal of health insurance				

19. Others,
specify.....

SECTION C: Teachers’ Attitudes towards Digitalisation Programmes

Please indicate the extent to which you agree or disagree to the following statements: Strongly Agree (SA), Agree (A), Undecided (U) Disagree (D), and Strongly Disagree (SD).

Attitude of teachers towards digitalisation programmes	SD	D	U	A	SA
20. As a teacher, I am happy about government’s digitisation programmes.					
21. I am sure education will stand to benefit from the government’s digitisation programmes.					
22. The digitalisation agenda is helping the economy of Ghana.					

23. I find the use of digital programmes more flexible than the traditional one.					
24. The digitisation agenda has come to make my work easier as a teacher.					
25. I would love to use the various digitised programmes being introduced.					
26. As a teacher, I find the digitisation programme very useful.					
27. I do not think the government's digitisation agenda has anything better to help the country.					
28. I believe that the digitisation programmes will help the education sector to improve.					

29. **Others,**
 specify.....

SECTION D: Teachers' Level of Use of Digitalisation Programmes

Please indicate the extent to which you agree or disagree to the following statements: Strongly Agree (SA), Agree (A), Undecided (U) Disagree (D), and Strongly Disagree (SD).

Teachers' Level of Use of Digitalisation Programmes	SD	D	U	A	SA

30. I am able to transfer money across different networks.					
31. I do use any of the government's digitisation programme.					
32. I use the online passport.					
33. Digital platforms such as CSSPS has made placement of students into the second cycle level stress free, more efficient and effective.					
34. Using the QR code payments system for banks has enabled the teacher maximise his/her instructional time and also in e-commerce.					
35. In general, I have been using the government's digitised services					

Thank You

